# THE BRITISH PALLADIUM:

OR,

## *Annual Miſcellany of Literature and Science:*

For the YEAR 1774.

In TWO PARTS.

The *Firſt* containing *new, general,* and *ſelect,* SUBJECTS: With an *Alphabetical* CHRONICLE (Number III.) of remarkable Events; and SHORT GRAMMATICAL TABLES of the *Terminations* of the *Latin Verbs,* (through all the *Moods* and *Tenſes* of the 4 CONJUGATIONS, *methodized* and exemplified for the *moſt Eaſe* to the *Memory:* Making the *moſt difficult* Part of LATIN GRAMMAR the *moſt eaſy.*

The *Second* comprehending *Anſwers* to former *Enquiries:* With a *Variety* of *new* and *entertaining* Things propoſed.

Serving for *Land* and *Sea.*

The *Twenty-ſixth* Number publiſhed.

With which may be had, (*juſt publiſhed,* that ſhould have been publiſhed with laſt Year's *Palladium,*) *The Practical Arithmetician, or Art of Numbers improved:* Being a Set of *new, ſhort, practical,* and *mechanical, Rules,* in all the Branches of *Arithmetic,* (*perfected* without an *Appendix,*) for exerciſing, with Readineſs and Facility, all Parts of the *arithmetical Art. Serving for Schools and private Tutors.*

Alſo *The Seaman's Guide,* (juſt publiſhed,) *or Key to the Nautical Ephemerides,* for keeping a Reckoning of *Longitude,* from Obſervation, on Board his Majeſty's Ships at Sea, *as far as is practical.* (According to the *Method* borrowed from the *French* by our Reverend *Conductor* of the Longitude).

By the AUTHOR of the *Improved Royal Aſtronomer and Navigator.*

As *Bees* extract the *Sweets* from every *Flow'r,*
So ſhould the *Sons of Science* ſpend each Hour;
Gather from all the *Branches* in Eſteem,
And be *acquainted* with each *uſeful* Theme. *Peregrinator.*

LONDON: Printed for D. STEEL, Number 1, *Union Row,* the lower
End of the *Minories, Little-Tower Hill.* 1774. Price One Shilling.

## *To the* PALLADIUM-AUTHOR.

SIR, *Morpeth, Northumberland, January* 26, 1773.

THE following is an ACCOUNT of an *original Author*, whoſe *Genius* has appeared, with a *bloody Knife* in its Hand and a *Steel* by its Side, to all the *Palladium Correſpondents* in the Country, not a little *diſmayful* and *ſtartling* to Many, though not ſo to, *Sir, your humble Servant and conſtant Reader,*

CLERICUS, M. A.

## *The* TALL BLOODY BUTCHER, *and the* LITTLE BLACK MAN!

*In nova fert Animus mutatas dicere Formas.* Ovid. Met. l. 1.

THE *bloody Butcher* on the Shelf
Of NATURE lay, neglected *Delft*:
Dame *Nature*, did the *Foreman* ſay,
What ſhall we make of this *coarſe* Clay?
For 'tis too dull and unrefin'd
An *Outſide* for a *thinking* Mind.
When Madam *Nature* with a gruff
Diſdainful *Leer* beheld the *Stuff*;
Then *ſmil'd*, and ſaid, 'tis coarſe and ſtubbiſh,
Yet we'll make *Somewhat* of the *Rubbiſh*.
We us'd to ſport in making *Monſters*,
We'll make a *Savage* up with long Ears;
His barren Brains and Want of Senſe
Supply with matchleſs Impudence!
We'll make him neither Mule nor Aſs,
But *Ruffian* tall, with Front of Braſs!
With Mind *unfeeling* as the Rocks,
And Body to endure *hard Knocks*;
Not prone to any Kind of Good,
But made to ſerve for *ſhedding Blood!*
Yet *Steel* or *Balls* ſhall ſhake his Soul,
And make him ſneak into a Hole!
Accordingly they in a Trice
Form'd him fit *Implement* for *Vice*.
Then Fire from *Ætna* fetch'd ſtraitway
To animate this ſtubborn Clay.
This *Ruffian* was no ſooner made
Than he began the *rhiming Trade*;
At the *Palladium* he let fly,
As if he meant to ſtorm the Sky;
And aim'd a Shaft at *Polly Stow*,
But, wanting Wit, he ſunk below;
*Obſcenity* he ply'd amain,
But *impotently* ſtrove in vain;
Then Calumny and Scandal tries,
And has Recourſe to barefac'd L--s:
But all theſe Tricks would not avail him,
His other *Deeds* in *Newgate** jail him.
He ran away,† but is ſtopt ſhort,
And you will find him *next* at *Court*; ¶
If there you miſs him — pleaſe to call
At *Triangular Town*‖ or *Surgeons Hall*.‡

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* *A Palace in* London *for the Meritorious.*

† *Was concealed at* Greenwich; *a Star-gazing Town.* ¶ *The* Old-Bailey.

‖ Paddington; *a mathematical Town.* ‡ *In the* Old-Bailey.

*Tradition* gives us this Relation
Of one *unborn* to Reputation;
We're told how, on a *diſmal* Night,
There ſtood preſented to his Sight
(Or ſeem'd to ſtand) a *ſmall black Man!*
With *Hoofs* and *Horns*, and Viſage wan,
Who (as a *Witch* glides through a Hole)
Into his *inmoſt* Chambers ſtole,
And with his *Conſcience* ſneak'd away,
Which he detains unto this Day.
If any Man will undertake
To catch the *Thief*, and bring him back;
Detect him, cauſe him to reſtore it,
The *Butcher* will *reward* him for it.

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## *To the* PALLADIUM-AUTHOR.

SIR, If the following *Obſervations* are worthy of your Notice, I ſhall be glad to ſee them publiſhed in your *uſeful Palladium*. Who am, Sir,

*On-board the* Cambridge, *Your moſt humble Servant*,
July 1, 1773. A SEA-OFFICER.

## *A* COMPARISON *of the* NAUTICAL EPHEMERIS, 1774, *for* Greenwich, *with the* CONNOISANCE DES TEMPS, 1774, *for* Paris.

### *Or, the* DISCOVERERS *of the* LONGITUDE *diſcovered.*

NOTWITHSTANDING the *great Expence* this Nation has been at for *Mayer's ſolar and lunar Tables*, (which coſt 3000*l.*) and paying ſeveral *annual Salaries* to Computers, for uſing them, and executing the Office of *Aſtronomer Royal*, with other attending Expences for carrying a *Nautical Ephemeris* (for diſcovering the Longitude at Sea by Obſervation) into due Execution, it is *ſeen*, that great, if not the greater, Part of the *Britiſh Nautical Ephemeris*, 1774, for *Greenwich* Meridian, commanded to be uſed in the Navy, exactly correſponds with the ſame Kind of Computations in the *Connoiſſance des Temps*, 1774, for the Meridian of *Paris*, publiſhed before the ſaid *Ephemeris*.

The *Lunations* for *Greenwich* (from which *Aid* might be expected in the *Oppoſitions* for aſcertaining the Longitude at Sea) *exactly* correſpond with thoſe in the *Connoiſſance des Tems* for *Paris*, when 9$^{m}$ are taken from the Times of the *Paris* Lunations. But the *Greenwich* Lunations ſhould be computed by *Mayer's Tables*, purchaſed by our Government *partly* for that Uſe, yet are *borrowed* from the *Paris* Lunations, (calculated by *De la Caille*'s or other Tables, not *Mayer*'s,) as it *cannot be ſuppoſed* that the *French* Calculations, firſt publiſhed, were *borrowed* from ours.

This *Miſuſe* of the Money, advanced by our Government for making our own Calculations by *Mayer*'s purchaſed Tables, is farther *manifeſted* in the Times of the Eclipſes of the 4 Satellites of *Jupiter*, in the *Nautical Ephemeris*, 1774, for *Greenwich*, correſponding with the Times of thoſe *Eclipſes* for *Paris* exactly; when 9$^{m}$ 16$^{s}$ are abated from the Times of the latter for thoſe of the former. And the *Configurations* of theſe 4 Satellites, for each Day of the Year, in the *Nautical Ephemeris*, and thoſe in the *Connoiſſance des Tems*, are ſeen to be *exactly* the ſame for the Meridians of *Greenwich* and *Paris*.

The Times of the *Moon's Paſſages* by both thoſe Meridians, the *Moon's Declinations* and *horizontal Parallaxes*, (and conſequently *Diameters*,) at Noon, are exactly the ſame in both thoſe Productions, *one being a direct Copy from the other* without the *leaſt* Variation; notwithſtanding the *Difference* of the two Meridians; and the different *Tables* they are ſuppoſed to be computed by. Yet the

*Moon's Latitudes* at Noon, *Places*, and *Right-Aſcenſions*, *widely differ* in both thoſe Performances. Which *Paradox* refers to the *Engliſh Calculators* to reſolve.

The two *Eclipſes* of the Sun in the *Nautical Ephemeris*, for *Greenwich*, agree with the Times of thoſe *Eclipſes* in the *Connoiſſance des Tems*, for *Paris*, (except by an exceedingly *ſmall*, ſuppoſed to be made, *Difference*,) when 9m 16s are *abated* from the *Paris* for the *Greenwich* Times, at the ſame Inſtant, (the Difference of Meridians,) and about 18° 15′ *abated* from the *Ferro* Longitude at *Paris*, for the Longitude from *Greenwich*, where the ſame *Phænomena* are ſaid to happen.

The *Diſtances* of the Moon's *Center* from the Sun's *Center*, and alſo fixed Stars, are printed *exactly* the ſame in *both Performances*, for both Meridians, *Greenwich* and *Paris*. But, in the *Nautical Ephemeris*, the Stars are called by their proper Names, which, in the *Connoiſſance des Tems*, have only *referential Greek* Characters to diſtinguiſh them. This is another *Paradox* referring to the *Engliſh Longitude-Schemers* for Solution: How the ſame *Phænomena* ſhould appear, at the *ſame* Time, *reckoned* under two diſtant Meridians, 2° 20′, or 9m 20s in Time, aſunder, according to Dr. *Halley*; or more or leſs, according to the *Macaroni Hair-Splitters*, *Engliſh* and *French* Refiners.

It ſurely will not be objected, as a *Defence* for the *Engliſh* Calculators, that the *French Computers* have *borrowed* their Calculations from ours, when the induſtrious *Academicians* have *generally* produced their Calculations, for Time forward, before ours. And then a *Queſtion* will follow to be anſwered, which of the two *Parties*, entruſted with a public Charge for duly executing, have acted with the moſt Fidelity and Honour to their reſpective Country. And *ſurely* it will not be urged that both Parties of Calculators have been in *Confederacy* againſt the Honour of their own Country.

The *Britiſh Computers* make as puzzling a *Myſtery* of their *mixed* and *borrowed* Calculations (and ſome of *no Uſe at Sea*) as of the Longitude they ſeek. But we, on-board the *Navy*, make the ſame Uſe of the *Nautical Ephemeris* as we do of a *Pack of Cards* or the *Back-gammon Tables*; to paſs an idle Hour or to kill Time! For, as we find none is paid for *chacing* the *Longitude-Prize* but *Longitude Schemers* and *Projectors*, (for whoſe Profit we are *annually* out of Pocket by being *compelled* to buy their Work,) we have long given over the *Chace* ourſelves, without endeavouring to come up with what is not worth our *picking up*.

In the *Preface* to the *Nautical Ephemeris* for 1774, the reverend *Superintendent* or *Commander in Chief* of *Longitude*, thinking the Reputation of his *wonderous Work* diminiſhed or leſs eſteemed than it deſerves, (wherein are *Calculations* and *Crotchets* not wanted at Sea,) has begun and continued a *modeſt* Diſpute, for two Years together, with Mr. *Bernouilli*, (a young and eminent Aſtronomer to his *Pruſſian* Majeſty,) to ſettle the Importance of his *Nautical Ephemeris*. It is about the *Trifle* of 13″ Difference between the ſolar Places, obſerved in Mr. *Bernouilli*'s *Recueil pour les Aſtronomes*, as calculated by *De la Caille*'s Tables, and the *Superintendant* of Longitude's Places, calculated by Mr. *Mayer*'s Tables; to the former of which Tables the Preference is given. But, as Mr. *Bernouilli* is denied the Liberty of a *harmleſs* Obſervation, (without a Condeſcenſion and Acknowledgement demanded for it,) he will ſurely preſerve his *eſteemed Talents* and *polite Spirit* for a better Uſe than to gratify ſo *peremptory* a Demand, made in the Face of the Public. This Gentleman might, with the ſame Propriety, demand of his *Exacter*, to make a Sermon upon *Liberty* and *Tom Pa'*,* and preach it *publicly*.

Whereas, every Month's Calculations of the *ſolar* Places in the *Nautical Ephemeris* are ſeen to differ more than 13″ from the *ſolar* Places in foreign *Ephemerides*, when the *Difference* of Meridians, in mean Motion, is allowed; *viz* 23″ to be added to the *Paris* for the *Greenwich* ſolar Places. Or 5′ 5″ to be added to the *Paris* for the *Greenwich* lunar Places, at Noon; allowing 9m 16s only, Difference of Meridians, in Time. — The *Planets* Places, in the *Nautical Ephemeris*, differ not ſo *exactly* regular from thoſe in the *Con. des Tems*, as the other Calculations differ, for determining *how far they are borrowed*.

A NEW

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* *Name of a pious Sea-Chaplain; one of whom preached in* Siſſon's *Cole-hole*, Strand.

## A NEW GUIDE to the YEAR 1774.

## PART I.

### *To find the Day of the Month from the Day of the Week, and Day of the Week from the Month-Day.*

Againſt each Month of the Year, to the Right-hand, ſtand the Seven Week-Days, above which ſtand all the Month-Days in that Month, anſwering to each Week-Day.

*Contrarily.* Under any Month-Day ſtands the Week-Day againſt that Month, at the Angle of Meeting.

| | MONTH DAYS and WEEK-DAYS. | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| | 29 | 30 | 31 | | | | |
| MONTHS of the YEAR. | | | | | | | |
| January. October. | Sa | Su | Mo | Tu | We | Th | Fr |
| February. March. November. | Tu | We | Th | Fr | Sa | Su | Mo |
| April. July. | Fr | Sa | Su | Mo | Tu | We | Th |
| May. | Su | Mo | Tu | We | Th | Fr | Sa |
| June. | We | Th | Fr | Sa | Su | Mo | Tu |
| Auguſt. | Mo | Tu | We | Th | Fr | Sa | S |
| September. December. | Th | Fr | Sa | Su | Mo | Tu | We |

For *Conſtruction* of the above Table, *ſee P.* 2, *Palladium*, 1763.

EXAMPLE I. *To find the Day of the Month anſwering to the third Sunday in March*, 1774.

To the Right-hand of *March* you find Su, or *Sunday*; directly above which, in the Columns among the Month-Days, ſtand 6, 13, 20, 27, anſwering to all the *Sundays* in *March*: Therefore the third *Sunday* is the 20th Day, required. So for other like Caſes.

EXAMPLE II. *To find the Day of the Week on which the 29th of* September, or Michaelmas-day, *happens*, 1774.

Under 29, the Month-Day, againſt *September*, at the Angle where the *upper* and *Side* Columns meet, ſtands Th, or *Thurſday* required.

| NOTES for 1773. | |
|---|---|
| Dom. Let. N.S. | B |
| ——— O. S. | E |
| Golden Number | 8 |
| Epact (or ☽'s Age Year's Beginning) | 17 |
| Sun's Cycle | 19 |
| Roman Indiction | 7 |
| Era Jul. Pe | *Ja.* 6487 |
| —Olympds | *Jul.* 2550 |
| —Found. Ro. | *Ap.* 2527 |
| —Nabonaſſar | *Fe* 2521 |
| — Hegira | *July* 1153 |
| Greg. Era | *Oct.* 192 |

Yrs completed at the Mths, O.S Olymp. 2 Yrs more than by *de la Lande**. See *Axioms & Rules*, p. 351, *R. Aſtr.*

| Moveable FEASTS. | | |
|---|---|---|
| Jan. | 30. | *Septuageſ* |
| Feb. | 16. | *Aſh-Wed.* |
| | 20. | 1 *Sund. Lent* |
| Apr. | 3. | *Eaſt. Sund.* |
| May | 8. | *Rog. Sund.* |
| | 12. | *Aſcenſion* |
| | 22. | *Whitſunday* |
| | 29. | *Trin Sund.* |
| Nov | 27. | *Advent Sun.* |

| Ember-Days. | | | |
|---|---|---|---|
| Feb. | 23, | 25, | 26. |
| May | 25, | 27, | 28. |
| Sep. | 21, | 23, | 24. |
| Dec. | 14, | 16, | 17. |

*The Reſt the ſame wth his Con of former Accts in *Con. des Tems.*

| SUN riſes. | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mths. | 1ſt | | 11th | | 21ſt | | |
| | h | m | h | m | h | m | |
| Jan. | 8 | 5 | 7 | 58 | 7 | 45 | |
| Feb. | 7 | 22 | 7 | 6 | 6 | 30 | |
| Mar. | 6 | 32 | 6 | 12 | 5 | 52 | |
| April | 5 | 31 | 5 | 11 | 4 | 53 | |
| May | 4 | 35 | 4 | 20 | 4 | 4 | |
| June | 3 | 51 | 3 | 45 | 3 | 43 | |
| July | 3 | 46 | 3 | 54 | 4 | 4 | |
| Aug. | 4 | 20 | 4 | 36 | 4 | 54 | |
| Sep. | 5 | 15 | 5 | 32 | 5 | 54 | |
| Oct. | 6 | 13 | 6 | 33 | 6 | 33 | |
| Nov. | 7 | 12 | 7 | 30 | 7 | 45 | |
| Dec. | 7 | 58 | 8 | 6 | 8 | 8 | |

*Examples.*

Againſt *May* the Sun riſes

| | h | m |
|---|---|---|
| 1ſt | 4 | 35 |
| 11th | 4 | 20 |
| 21ſt | 4 | 4 |

Dif. 15m in 24 Hours, & 16m *leſs* for 10Ds. or 1m½ a Day *nearly*.

*N. B.* Sun-riſing ſub. from 12h gives Sun-ſetting.

*N. B.* The *complete* Years of the ſeveral Æras end at the *Month*, then the *current* Years take Place; each for a Year following.

*Aſtronomical*

## *Aſtronomical* MOONS *for Greenwich-Obſervatory,* 1774.

| | Laſt Quarter. | | | New Moon. | | | Firſt Quarter. | | | Full Moon. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mths. | d | h | m | d | h | m | d | h | m | d | h | m |
| Jan. | 5 | 5 | 40 A | 12 | 8 | 45M | 19 | 3 | 11 A | 27 | 6 | 48 A |
| Feb. | 4 | 2 | 56M | 10 | 8 | 38*(39)A | 17*(18) | 11.55M | | 26 | 10 | 30M |
| Mar. | 5 | 10 | 21M | 12 | 9 | 55M | 20 | 8 | 31M | 27 | 11 | 28 A |
| Apr. | 3 | 4 | 58 A | 11 | 0 | 19M | 19 | 3 | 14M | 26 | 9 | 34M |
| May | 2 | 11 | 58 A | 10 | 3 | 16 A | 18 | 6 | 58 A | 25 | 5 | 22 A |
| June | 1 | 8 | 23M | 9 | 6 | 20M | 17 | 7 | 20M | 23 | 11 | 57 A |
| | 30 | 6 | 59 A | [*N. B.* M ſtands for *Morning* and A for *Afternoon*.] | | | | | | | | |
| July | 30 | 8 | 17M | 8 | 9 | 17 A | 16 | 4 | 36 A | 23 | 6 | 41M |
| Aug. | 29 | 0 | 26M | 6*(7) | 11.56A(M) | | 14 | 11 | 35 A | 21 | 2 | 51 A |
| Sep. | 27 | 7 | 4 A | 6 | 1 | 59M | 13 | 5 | 27M | 20 | 1 | 17M |
| Oct. | 27 | 3 | 8 A | 5 | 3 | 0 A | 12 | 11 | 33M | 19 | 2 | 27 A |
| Nov. | 26 | 10 | 58M | 4 | 2 | 51M | 10 | 7 | 7 A | 18 | 6 | 16M |
| Dec. | 26 | 4 | 43M | 3 | 1 | 44 A | 10 | 5 | 5M | 18 | 0 | 16M |

* *Time by* Con. des Tems, ( ) *by* Naut. Eph. *Dif.* $12^h$ *by copying wrong here.*

| *Add* to the Month-day for the Moon's Age. | | New ☽. | Sun and Moon's Place at New Moon. | | Sun enters Signs. | | *Sub.* and *add* from and to ☽'s Southing for her Riſing & Setting. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ☽ Place. | | Arc* ∓ | |
| | No. | d | s | ° | | d | s | ° | h | m |
| Jan. | 18 | 12 | 9 | 22 | ♒ | 19 | 3 | 0 | 8 | 30 |
| Feb. | 19 | 10 | 10 | 22 | ♓ | 18 | 4 | 2 | 8 | 15 |
| Mar. | 18 | 12 | 11 | 22 | ♈ | 20 | 5 | 1 | 7 | 15 |
| Apr. | 19 | 11 | 0 | 22 | ♉ | 20 | 6 | 0 | 6 | 15 |
| May | 19 | 10 | 1 | 20 | ♊ | 21 | 7 | 11 | 5 | 15 |
| June | 21 | 9 | 2 | 19 | ♋ | 21 | 8 | 10 | 4 | 15 |
| July | 21 | 8 | 3 | 16 | ♌ | 22 | 9 | 0 | 4 | 0 |
| Aug. | 23 | 7 | 4 | 15 | ♍ | 23 | 9 | 20 | 4 | 15 |
| Sep. | 24 | 5 | 5 | 13 | ♎ | 23 | 10 | 29 | 5 | 15 |
| Oct. | 25 | 5 | 6 | 12 | ♏ | 23 | 0 | 0 | 6 | 15 |
| Nov. | 26 | 4 | 7 | 12 | ♐ | 22 | 0 | 29 | 7 | 15 |
| Dec. | 26 | 3 | 8 | 11 | ♑ | 21 | 1 | 28 | 8 | 15 |

Here the Day of N. ☽ and No. added for the following Month make up the Days in the preſent Month.

*Exam.* Sep. N. ☽ $5^d$, & Oct. 25, added = 30Ds. in Sept. the preſent Month N. ☽ Mar. 12 & Ap. 16 added = 31 Ds. in Mar.

*To find Moon's Age.*
*Ex.* I. *May* 20
Add No. 19
39
Sub. 29
Moon's Age 10

*Ex.* II. *July* 15
Add No. 21
36
Abate 29
Moon's Age

☞ When ☽ Age is above 29 or 30Ds. ſub. 29 or 30, as 1. & 2d $Col^s$ ($ag^t$ Mth) are 29 or 30

*To find Sun's Place.*
Sub. or add Deg. for Ds. bef or aft. ☉ enters a Sn. for his Place.
*Required Sun's Place for Apr.* 30, 1774.
21 *Ap.* ☉'s Pl. $1^s$ 2°
8 Ds. & $Deg^s$. + 8
30 *Ap.* ☉'s Pl. 1 10
at Noon.

*Req.* ☽ *Pl. Jan.* 23.
☽'s Age $11^d$
Paſt N $+11 \times 13^{\circ}\frac{1}{6}$
$= 4^s\ 25^{\circ}$
☽'s Pl. at N. ☽. } 9 22
☽ Pl *Jan.* 23, Noon } 2 17
A *near* Comput. only

*To find* ☽'s *Riſing & Setting, Ja.* 23, 1774.
☽ m. Pl. fr. ab. $2^s\ 17^{\circ}$
Arc* correſ ∓ $8^h$ 21
☽'s So. 23d D. 8 a 54
☽ riſes $23^d$ 0 a 33
Sets 24th 5 m 15
*N. B.* Take the * Arc ∓ neareſt or proport. to ☽'s Place above.

To find the *Tides* at *London.*

*Rule.* Add $2^h$ $30^m$ to Time of ☽'s $South^g$ (fr. the *Table* of her Southing) for Time of High Water *required*

*Ex. Jan.* 26, 1774, ☽ ſouths, by *Tab* $follow^g$
$26^d$ $11^h$ a $18^m$
Add 2 30
H.W. 1 m 48
Add 5 10
L.W. 6 m 58
at *Lond.* Bridge.

*N. B.* Time of H. & L. W. at *Lond.* ſerves for Boats and Veſſels bound down & up the R. or fr. ab. & below Bridge, to *Lond.* reſpectly *Gen. Rule.* Add the T. of H. W. at N. and Full ☽ for any *Place*, $accor^g$ to a *Tide-Tab.* to the Time of ☽'s Southing, that Day, for H. W. at that Place.

N. B. *The Feſtival marked * is preceded by a Vigil or Faſt. If any of the Feaſt-days fall on a* Monday, *the Vigil or Faſt-day muſt be kept on the* Saturday *before, and not on the* Sunday, *which is the greateſt of Feſtivals.*

*The Days having this Mark,* †, *againſt them are Holidays obſerved at the* Exchequer, Stamp-Office, Exciſe-Office, Cuſtom-Houſe, Bank, Eaſt-India, *and* South-ſea Houſe.

☞ *At the* Cuſtom-Houſe *there is no Holiday on* Valentine, St. David, Shrove-Tueſday, Eaſter-Wedneſday, St. Swithin, Lammas-day, Fire of London, *or* Holy-Rood.

†‡† *The Offices are mentioned* ‘ All but ſuch and ſuch,’ *after* †, *where no Holidays are kept, when they are kept in all the other Offices.*

## MEMORANDUMS *for the* YEAR.

### JANUARY, XXXI DAYS.

1 Circumciſion. †
2 2 *Sunday after Chriſtmas.*
4 Sir Iſaac Newton b. 1643, N S.
6 Epiphany, or Twelfth-day. † All but South-ſea Houſe.
8 Lucian.
9 1 *Sunday after Epiphany.*
13 Hilary Cam. Term begins.
14 Oxford Term begins.
15 Exchequer opens.
16 2 *Sun. after Epiph.*
17 Old 12th-day.
18 Priſca. Q Cha. Birth-day kept. † Ruffians at Portſmouth, on Friday, 1771.
20 Fabian. 1 Return.
21 Agnes.
22 Vincent.
23 3 *Sunday after Epiphany.*
24 Hilary Term begins.
25 Converſion of St. Paul. †
27 2 Return.
30 *Septuageſ. Su.* Cha. I. beheaded 1648-9, O.S. 12$^{m}$ paſt One. †

### FEBRUARY, XXVIII DAYS.

2 Purific. B. V. or Candlemas. †
3 Biſhop Blaize. 3 Return.
5 Agatha.
6 *Sexageſima Sunday.*
9 4 Return.
10 Dies ſcholaſtica at Oxford.
12 Hilary Term ends.
13 *Quirquageſima, or Shrove-Sund.* Valentine. † All but Stamp, Cuſtom, and South-ſea Houſe. Shrove-Monday.
15 Shrove-Tueſday. † All but the Cuſtom-Houſe.
16 Aſh-Wed. 1ſt Day in Lent. †
17 Cambridge Commencement for B. A. Day after Aſh-Wedneſ.
20 1 *Sunday in Lent.*
23, 25, 26, Ember-days.
24 St. Matthias.* †
27 2 *Sunday in Lent.*
28 Hare-hunting goes out.

### MARCH, XXXI DAYS.

1 St. David. Anniverſary-Meeting of the Welch Society, who wear a Leek on this Day in Memory of a famous Victory gained over the Saxons. † All but the Stamp and Cuſtom-H.
2 Chad. B.
6 3 *Sunday in Lent.*
7 Perpet. Maurit.
12 Gregory Mart.
13 4 *Sunday in Lent, or Midlent-Su.*
17 St. Patrick, Biſhop of Ireland. Cambridge latter Act, Thurſday after the 4th Sunday in Lent.
18 Edward, K. of the W. Saxons.
19 Joſeph.
20 5 *Sunday in Lent.* Cuthbert. Equal Day and Night.
21 St. Benedict.
25 Annunciation of the V. Mary.* Lady-Day, 1ſt Quarter-D. †
26 Oxf. T. ends, Sat. bef. Palm-Sun.
27 6 *Sunday in Lent, Palm-Sund.*
31 Ruffians at Portſmouth, on Friday, 1769. Maundy-Thurſd. Sir I. Newton died, 1727, N.S.

### APRIL, XXX DAYS.

1 Fool's-Cap Day; Hatton-Harry, Exeter Jack, Leonard Libel, Mr. O Fagon, Sanguinarius, Greenovicenſis, &c. Good Fri. †
3 Easter Su. Rd, Bp Chicheſter.
4 Eaſter-Monday. † St. Ambroſe.
5 Eaſter-Tueſday. † Old Lady-d.
6 Eaſter-Wed † All but Cuſtom-h.
10 1 *Sund. after Eaſter. Low-Sund.*

13 Oxford and Camb. Terms begin Wedneſday after Low-Sunday.
15 Sun and Clocks together.
17 2 *Sunday after Eaſter.*
18 1 Return.
19 Alphege.
23 St. George. †
24 3 *Sunday after Eaſter.*
25 St. Mark † 2 Return.
27 Victory of Culloden.

### MAY, XXXI DAYS.

1 4 *Sunday after Eaſter.*
St. Philip and St. James. †
2 3 Return. Weſtminſt. Election, Day after 4th Sun. after Eaſter.
3 Invention of the Croſs.
6 St. John ante Port. Lat.
8 5 *Su. aft. Eaſter, Rogation-Sun.*
9 4 Ret. 9, 10, 11, Rogation-days.
12 Old May-day.
Aſcenſion-day, or Holy Thurſ. †
13 5 Return.
15 *Sun. aft. Aſcenſion, or* 6 *S. af. Eaſt.*
16 Term ends.
19 Dunſtan. Q. Charlotte b. 1744.
Oxf. Ter. ends, Th. bef. Whit-Su.
22 Whit-Sunday.
Princeſs Elizabeth born 1770.
23 Whit-Monday. †
24 Whit-Tueſday. †
25 Whit-Wedneſday. † All but the Cuſtom-houſe.
25, 27, 28, Ember-days.
26 Auguſtine, 1ſt Abp. of Cant.
No Night, but all Twilight.
27 Venerable Bede.
29 *Trinity-Sunday.*
King Charles II.'s Nativity and Reſt. after 12 Yrs Exile.
30 1 Return.

### JUNE, XXX DAYS.

1 Nicomedes. Oxford Term beg.
3 Trin. Term begins.
4 King George III. born 1738. †
5 1 *Sunday after Trinity.* Boniface.
Prince Erneſt b. 1771.
6 2 Return.
10 Princeſs Amelia b. 1711. † All but Excheq. and Cuſtom-houſe.
11 St. Barnabas. †
12 2 *Sunday after Trinity.*
13 3 Return.
16 Sun and Clocks together.
17 St. Alban.
19 3 *Sun. after Trin.*
20 Tranſl. of Edw. K. W. Saxons.
4 Return.
22 Longeſt Day. Term ends.
24 St. John Baptist. † 2d Quarter-day.
26 4 *Sunday after Trinity.*
29 St. Peter and Paul. †
Oxford Act, 7 Days bef. Cambridge Commencement.
30 Buck-hunting comes in & continues till Holy-rood. Exeter & Wadham Col. Elect. at Oxf.

### JULY, XXXI DAYS.

2 Viſitation of the B. V. Mary.
3 5 *Su. af. Trin.* Dies Comitiorum.
4 Tranſlat. of St. Martin, Biſhop.
5 Cambridge Commencement for B. A. 1ſt Tueſday in July.
Old Midſummer-day.
7 Tho. à Becket, Church Tyrant.
8 Cambridge Term ends.
10 6 *Sunday after Trinity.*
15 St. Swithin. † All but Stamp, Cuſtom, and South-ſea Houſe.
17 7 *Sun. after Trin.*
20 Margaret, Virgin and Martyr.
22 Mary Magdalen.
Q. of Denmark born 1751. † All but Excheq. & Cuſtoms.
24 8 *Sun after Trin.*
Magdalen College Election.
25 St. James *†
26 Ann, Mother of the B. V. Mary.
27 Portſmouth-Dock fired at 4 in the Morning, 1770.
30 Dog-days begin. Canicula riſes with the Sun.
31 9 *Sunday after Trinity.*

### AUGUST, XXXI DAYS.

1 Lammas day. †
4 Crown-Point in America taken by General Amherſt, 1759.
6 Transfiguration.
7 10 *Sunday after Trinity.*
Name of Jeſus.
10 St. Laurence.
11 Princeſs of Brunſwic b. 1737. † All but Cuſt. and S. S. H.
12 Prince of Wales born 1762. †
14 11 *Sunday after Trinity.*
15 Aſſumption.
16 Bp. of Oſnaburgh b. 1763.
21 12 *Sunday after Trinity.*
Athanaſius. Pr. Wm b. 1765.
24 St. Bartholomew. †

28 13 *Sunday*

28 13 *Sunday after Trinity.* St. Auguſtine.
29 Beheading of St. John Baptiſt.
30 Sun and Clocks together.

### SEPTEMBER, XXX DAYS.

1 St. Giles.
2 London burnt, 1666, O. S. †
4 14 *Sunday after Trinity.*
7 Eunurchus.
8 Nativity of the B. V. Mary.
9 Dog-days end. Canis Major riſes with the Sun at 3 in the Morn.
11 15 *Sunday after Trinity.*
14 Holy-Croſs Day. † All but Sta. Cuſtom and South-ſea Houſe.
17 Lambert B.
18 16 *Sun. after Trin.* City of Quebec ſurrendered to General Townſhend, 1759. K. George I. and II. landed. † All but at the Cuſtom-houſe.
21, 23, 24, Ember-days.
21 St. Matthew. †
22 K. Geo. III. and Q. Charl. Cor. 1761. † Equal Day and Night.
25 17 *Sunday after Trinity.*
26 St. Cyprian.
28 Sheriffs of London ſworn.
29 St. Michael, third Quarter-day. † Hare-hunting comes in and laſts till the End of Feb. Princeſs Charlotte b. 1766.
30 St. Jerome.

### OCTOBER, XXXI DAYS.

1 Remigius, Biſhop of Rhemes.
2 18 *Sun. after Trin.*
6 St. Faith.
9 19 *S. af. Trin.* St Dennis.
10 Old Michaelmas-day. Oxford and Cambridge Terms begin.
13 Tranſl. of K. Edw. Confeſſor.
16 20 *Sun. after Trin.*
17 Etheldred V.
18 St. Luke. †
19 St. Frideſwide, a Feſtiv. at Court.
23 21 *Sunday after Trinity.*
25 K. Geo. III. Acceſſ. † St. Criſpin.
26 King George III. proclaimed, 1760. † All but the Stamp, Exciſe, Cuſtom and S. S. H.
28 St. Simon and Jude. †
30 22 *Sunday after Trinity.*

### NOVEMBER, XXX DAYS.

1 All Saints. †
2 All Souls. † All but the Stamp, Cuſtom and South-ſea Houſe. Prince Edward born, 1768.
3 1 Return. All-Souls Col. Elect.
4 K. William b. 1605, O. S.
5 Gun-Powder Treaſon, 1605. †
6 23 *Sunday after Trinity.* Mich. Term begins. Leonard.
7 D. Cumberland b. 1745.
8 Princeſs Auguſta Sophia b. 1768.
9 Ld-Mayor's-d. Lon. † All but Ex.
11 St. Martin.
12 2 Return.
13 24 *Sunday after Trinity.* Britius, Biſhop.
15 Machutus.
17 Hugh Bp Lincoln. Anniv. Q. Eliz. Procl. † All but Cuſt. &S. S. H.
18 3 Return.
20 25 *Sunday after Trinity.* Edmund, King and Martyr.
22 Cecilia. Old Martinmas-day.
23 St. Clement.
24 Baliol College Election Thurſday before St. Andrew.
25 St. Catharine. 4 Return. D. of Glouceſter born 1743. †
27 *Advent Sunday.*
30 St. Andrew. †

### DECEMBER, XXXI DAYS.

4 2 *Sunday in Advent.* Barbary.
6 Nicholas.
8 Conception of the B. V. M.
11 3 *Sunday in Advent.*
13 Lucy.
14, 16, 17, Ember-days.
16 O Sapientia. Camb. Term ends.
17 Oxford Term ends.
18 4 *Sunday in Advent.*
21 St. Thomas. †
22 Shorteſt Day.
23 St. Clement. Sun and Clocks together.
25 Christmas-Day, 4th Quarter-Day. Fox-hunting comes in and laſts till Lady-day.
26 St. Stephen. †
27 St. John the Evangeliſt. †
28 Holy Innocents.
31 Silveſter, Biſhop of Rome.

### A TABLE *of the* MOON's *Southing, or Times when ſhe paſſes the Meridian of* Greenwich Obſervatory, *for the Year* 1774. *For the Uſe of Seamen, in finding the Time of Tides,* &c.

| D. | Jan. | Feb. | Mar. | Apr. | May | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | h m | h m | h m | h m | h m | h m | h m | h m | h m | h m | h m | h m |
| 1 | 2m20 | 3m18 | 2m 6 | 3m44 | 4m39 | 6m 7 | 6m18 | 7m13 | 8m22 | 8m46 | 9m51 | 10m 4 |
| 2 | 3 7 | 4 8 | 2 57 | 4 43 | 5 35 | 6 54 | 7 2 | 8 0 | 9 11 | 9 34 | 10 41 | 10 59 |
| 3 | 3 53 | 4 59 | 3 51 | 5 40 | 6 30 | 7 40 | 7 48 | 8 47 | 9 58 | 10 21 | 11 32 | 11 59 |
| 4 | 4 40 | 5 52 | 4 46 | 6 38 | 7 21 | 8 25 | 8 33 | 9 34 | 10 45 | 11 9 | 0a27 | 1a 0 |
| 5 | 5 20 | 6 47 | 5 42 | 7 34 | 8 10 | 9 10 | 9 19 | 10 22 | 11 32 | 11 58 | 1 24 | 2 2 |
| 6 | 6 19 | 7 44 | 6 39 | 8 27 | 8 57 | 9 55 | 10 5 | 11 10 | 0a20 | 0a48 | 2 23 | 3 2 |
| 7 | 7 11 | 8 43 | 7 37 | 9 17 | 9 43 | 10 40 | 10 52 | 11 57 | 1 8 | 1 41 | 3 23 | 4 0 |
| 8 | 8 5 | 9 42 | 8 34 | 10 6 | 10 28 | 11 26 | 11 39 | 0a44 | 1 56 | 2 35 | 4 22 | 4 55 |
| 9 | 9 3 | 10 40 | 9 30 | 10 53 | 11 13 | 0a13 | 0a26 | 1 33 | 2 46 | 3 31 | 5 20 | 5 47 |
| 10 | 10 4 | 11 36 | 10 24 | 11 39 | 11 59 | 1 0 | 1 13 | 2 17 | 3 38 | 4 20 | 6 18 | 6 36 |
| 11 | 11 5 | 0a30 | 11 16 | 0a26 | 0a45 | 1 47 | 1 59 | 3 3 | 4 32 | 5 28 | 7 8 | 7 23 |
| 12 | 0a 5 | 1 20 | 0a 5 | 1 12 | 1 32 | 2 34 | 2 45 | 3 51 | 5 28 | 6 26 | 7 58 | 8 8 |
| 13 | 1 3 | 2 9 | 0 52 | 1 58 | 2 19 | 3 21 | 3 31 | 4 41 | 6 25 | 7 22 | 8 46 | 8 54 |
| 14 | 1 57 | 2 56 | 1 38 | 2 45 | 3 6 | 4 7 | 4 18 | 5 33 | 7 25 | 8 16 | 9 33 | 9 40 |
| 15 | 2 48 | 3 42 | 2 25 | 3 32 | 3 53 | 4 52 | 5 5 | 6 28 | 8 22 | 9 9 | 10 19 | 10 26 |
| 16 | 3 37 | 4 27 | 3 11 | 4 19 | 4 40 | 5 38 | 5 53 | 7 25 | 9 18 | 9 59 | 11 6 | 11 12 |
| 17 | 4 23 | 5 12 | 3 57 | 5 17 | 5 27 | 6 25 | 6 44 | 8 25 | 10 14 | 10 48 | 11 3 | Morn |
| 18 | 5 8 | 5 58 | 4 44 | 5 55 | 6 14 | 7 14 | 7 38 | 9 25 | 11 8 | 11 37 | Morn | 0 0 |
| 19 | 5 52 | 6 45 | 5 30 | 6 43 | 7 1 | 8 4 | 8 36 | 10 25 | Morn | Morn | 0 40 | 0 47 |
| 20 | 6 36 | 7 32 | 6 19 | 7 31 | 7 48 | 8 58 | 9 36 | 11 22 | 0 0 | 0 24 | 1 28 | 1 34 |
| 21 | 7 21 | 8 20 | 7 7 | 8 19 | 8 38 | 9 56 | 10 38 | Morn | 0 50 | 1 12 | 2 15 | 2 20 |
| 22 | 8 7 | 9 9 | 7 55 | 9 8 | 9 29 | 10 57 | 11 38 | 0 19 | 1 39 | 2 0 | 3 3 | 3 5 |
| 23 | 8 54 | 9 58 | 8 44 | 9 58 | 10 23 | Morn | Morn | 1 12 | 2 26 | 2 48 | 3 50 | 3 51 |
| 24 | 9 42 | 10 47 | 9 33 | 10 49 | 11 21 | 0 0 | 0 38 | 2 2 | 3 14 | 3 36 | 4 36 | 4 35 |
| 25 | 10 30 | 11 36 | 10 22 | 11 40 | Morn | 1 2 | 1 36 | 2 51 | 4 1 | 4 23 | 5 21 | 5 19 |
| 26 | 11 18 | Morn | 11 13 | Morn | 0 21 | 2 3 | 2 30 | 3 39 | 4 49 | 5 11 | 6 6 | 6 3 |
| 27 | Morn | 0 25 | Morn | 0 39 | 1 23 | 3 0 | 3 21 | 4 26 | 5 37 | 5 58 | 6 51 | 6 49 |
| 28 | 0 6 | 1 15 | 0 4 | 1 38 | 2 25 | 3 54 | 4 9 | 5 13 | 6 24 | 6 45 | 7 37 | 7 37 |
| 29 | 0 54 | | 0 56 | 2 38 | 3 25 | 4 44 | 4 56 | 6 0 | 7 12 | 7 31 | 8 23 | 8 29 |
| 30 | 1 42 | | 1 50 | 3 39 | 4 22 | 5 32 | 5 42 | 6 47 | 7 59 | 8 17 | 9 13 | 9 25 |
| 31 | 2 30 | | 2 46 | | 5 16 | | 6 28 | 7 34 | | 9 4 | | 10 25 |

To find Time of H. Water, on any Day of the Month, at any given Place, for 1774.

Gen. Rule. *To the Time of the Moon's Southing* (fr. the above Tab.) *for that Day, add the Time of H. W. at N. and F. Moon in the given Place* (fr. Tide-Tab. p. 105, 106, Pal. 1765, or any other Tide-T.) *and the Sum, abating* 12, *when above* $12^h$ *will be T. of H.W.*

*Example.* To find the Time of High Water, at *London*, on *May* 10, 1774.

*From the above Table, the Moon ſouths, at* London, *on that Day,* $11^h 59^m$ Morn.
*To which add the conſtant Time of High Water at New and Full, Lond.* 2 30

*Time of High Water May* 10, *at* London, 2 29 A. *req.*
*Add for next Low Water,* 5 30

*Low Water at* London, May 10, 1774, 7 59 Aft.

N. B. *Time of H. W. ſerves for Boats & Veſſels bound to Places below Bridge, fr.* Lond. *and Time of Low Water ſerves for Boats & Veſſels bound to Places above Bridge, fr.* Lond.

⁂ *Seamen may determine the Time of H. & L. W. at all Places by the foregoing* Gen. Rule, *fr. the above Tab. and the conſtant Time of H. W. at N. & F. Moon, at each Place. fr. a Tide-Table. The above Table is alſo of Uſe for finding the Moon's near Time of Riſing and Setting, from her mean Place, and Semi-duration Arc, for any Place.*

TABLE *of the Eclipſes of the firſt* SATELLITE *of* JUPITER, *for* Gr. Obſ. 1774
*For finding the* Difference of Longitude, *by Sea or Land.*

| | January. | | February. | March. | April. | | May. | | June. |
|---|---|---|---|---|---|---|---|---|---|
| | Emerſions | | Emerſions | ♃ this Mth. | ♃'s Sat. are | | Immerſ. | | Immerſ. |
| D. | h m s | D | h m s | being ſo near | .nviſ. this mth | | *Paris* for | D. | h m s |
| 2 | 9* 33 39 | 1 | 11 36 57 | ☉, the Eclips | y being too | | the *Gr.* | 1 | 18 23 2 |
| 4 | 4 1 49 | 3 | 6* 5 44 | of his Sat. can | near the Sun. | | Times. | 3 | 12 51 4 |
| 5 | 22 30 1 | 5 | 0 34 33 | not be ſeen. | ——— | | ——— | 5 | 7 19 5 |
| 7 | 16 58 13 | 6 | 19 3 26 | The * is plac'd | Tho' it may be | | The Sat | 7 | 1 48 1 |
| 9 | 11 26 28 | 8 | 13 32 19 | againſt the | *ſeen* that ☽'s | | are too nr | 8 | 20 16 2 |
| 11 | 5* 54 46 | 10 | 8* 1 16 | viſible Eclip | Paſſages over | | the Sun to | 10 | 14 44 4 |
| 13 | 0 23 3 | 12 | 2 30 13 | ſes of the *firſt* | the Merid. is a | | be ſeen as | 12 | 9 12 5 |
| 14 | 18 51 26 | 13 | 20 59 14 | Sat. of ♃ to | direct Copy of | | yet. | 14 | 3 41 5 |
| 16 | 13 19 50 | 15 | 15 28 15 | *Greenwich.* | the *Paris Times*, | D. | h m s | 15 | 22 9 14 |
| 18 | 7* 48 15 | 17 | 9 57 22 | *N.B.* When | & the Times of | 16 | 20 7 3 | 17 | 16 37 2 |
| 20 | 2 16 4 | 19 | 4 26 27 | the Time at | *theſe Eclipſes* in | 18 | 14 35 41 | 19 | 11 5 3 |
| 21 | 20 45 10 | 20 | 22 55 36 | the Ship is la- | *N.Ep.* is an *ex-* | 20 | 9 4 12 | 21 | 5 33 4 |
| 23 | 15 13 40 | 22 | 17 24 45 | ter than that | *act Copy* of thoſe | 22 | 3 32 47 | 23 | 0 1 52 |
| 25 | 9 42 15 | 24 | 11 53 58 | at *Greenwich*, | in *Con. des Tms*, | 23 | 22 1 16 | 24 | 18 29 5 |
| 27 | 4 10 51 | 26 | 6* 25 10 | the Longitude | reduc'd to Me. | 25 | 16 29 47 | 26 | 12 58 12 |
| 28 | 21 39 32 | 28 | 0 52 23 | is *Eaſt*; if | of *Greenwich*, | 27 | 10 58 12 | 28 | 7 26 24 |
| 30 | 17 8 12 | | | ſooner, *Weſt* | by deduct'g 9$^{m}$ | 29 | 5 26 38 | 30 | 1 54 32 |
| | | | | of *Greenw.* | 16$^{s}$ from the | 30 | 23 54 57 | | |

| | July. | | Auguſt. | | Septemb. | | October. | | Novemb. | | Decemb. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Immerſ. | | Immerſ. | | Immerſ. | | Immerſ. | | Immerſ. | | Emerſions |
| D. | h m s | D. | h m s | D. | h m s | D. | h m s | D. | h m s | D. | h m s |
| 1 | 20 22 45 | 2 | 16 52 55 | 1 | 19 2 28 | 1 | 21 16 12 | 2 | 17* 55 23 | 1 | 3 36 13 |
| 3 | 14* 50 54 | 4 | 11 21 28 | 3 | 13* 31 26 | 3 | 15* 45 13 | | Emerſions | 2 | 22 4 16 |
| 5 | 9 19 8 | 6 | 5 50 5 | 5 | 8 0 27 | 5 | 10* 14 12 | 4 | 14* 31 42 | 4 | 16 32 19 |
| 7 | 3 47 20 | 8 | 0 18 45 | 7 | 2 29 28 | 7 | 4 43 13 | 6 | 9* 0 13 | 6 | 11* 0 17 |
| 8 | 22 15 33 | 9 | 18 47 23 | 8 | 20 58 33 | 8 | 23 12 11 | 8 | 3 28 43 | 8 | 5* 28 19 |
| 10 | 16 43 48 | 11 | 13* 16 6 | 10 | 15* 27 34 | 10 | 17* 41 9 | 9 | 21 57 19 | 9 | 23 56 16 |
| 12 | 11 11 57 | 13 | 7 44 51 | 12 | 9* 56 38 | 12 | 12* 10 4 | 11 | 16* 25 41 | 11 | 18 24 17 |
| 14 | 5 40 14 | 15 | 2 13 34 | 14 | 4 25 38 | 14 | 6 39 0 | 13 | 10* 54 4 | 13 | 12* 52 13 |
| 16 | 0 8 33 | 16 | 20 42 23 | 15 | 22 54 45 | 16 | 1 7 54 | 15 | 5* 22 25 | 15 | 7* 20 12 |
| 17 | 18 36 51 | 18 | 15* 11 12 | 17 | 17 23 47 | 17 | 19 36 47 | 16 | 23 50 44 | 17 | 1 48 7 |
| 19 | 13* 5 11 | 20 | 9 40 0 | 19 | 11* 52 51 | 19 | 14* 5 38 | 18 | 18 19 2 | 18 | 20 16 7 |
| 21 | 7 33 37 | 22 | 4 8 53 | 21 | 6 21 55 | 21 | 8* 34 28 | 20 | 12 47 18 | 20 | 14 44 4 |
| 23 | 2 1 55 | 23 | 22 37 48 | 23 | 0 50 57 | 23 | 3 3 17 | 22 | 7* 15 29 | 22 | 9* 12 1 |
| 24 | 20 30 23 | 25 | 17 6 40 | 24 | 19 19 59 | 24 | 21 32 4 | 24 | 1 43 41 | 24 | 3 39 57 |
| 26 | 14* 58 59 | 27 | 11* 35 3[illegible] | 26 | 13* 49 4 | 26 | 16* 0 48 | 25 | 20 11 51 | 25 | 22 7 51 |
| 28 | 9 27 21 | 29 | 6 4 34 | 28 | 8* 18 7 | 28 | 10* 29 30 | 27 | 14* 40 0 | 27 | 16 35 53 |
| 30 | 3 55 46 | 31 | 0 33 33 | 30 | 2 47 8 | 30 | 4 58 11 | 29 | 9* 8 6 | 29 | 11* 3 52 |
| 31 | 22 24 29 | | | | | 31 | 23 26 49 | | | 31 | 5* 31 52 |

*To find the Difference of Longitude from* Greenwich Obſervatory.

*Rule.* The Difference of Time between any *Eclipſe* of *Jupiter*'s *firſt Satellite*, at *Greenwich*, happening as above, and the Time the ſame *Eclipſe* is obſerved to happen under a diſtant Meridian, being turned into *Degrees*, at Sea or Land, will be the Difference of Longitude between *Greenwich* and the Place of Obſervation.

*Example.* Eclipſe of *1ſt Satellite* of *Jupiter* at *Greenwich*, *June* 12$^{d}$ 9$^{h}$ 12$^{m}$ 50$^{s}$
The ſame Eclipſe being obſerved at Sea, or a diſtant Port, *later*, 12 15 0 18

Hence, Dif. Lon. to the *Eaſt* of *Greenw* is 86° 52′ 35″, req. Dif. *later*, 5 47 28

## *Two* ECLIPSES *of the* SUN, *for* 1774.

I. *March* $12^{d}$ $9^{h}$ $56^{m}$, Morning, inviſible in *England*. The Moon's *Latitude* 1′ North.

This *Eclipſe* is central and annular, at Noon, in Latitude 2° South, and Longitude from *Greenwich* 31° Eaſt.

Mr. *Maſkelyne*, Aſtronomer-Royal, makes the Time, in his *Aſtronomical Ephemeris*, $9^{h}$ $55^{m}\frac{1}{2}$, Morning; Moon's Latitude $1'\frac{1}{2}$ South; centrally eclipſed on the Meridian at $9^{h}$ $57^{m}$, in Latitude $10^{\circ}\frac{3}{4}$ South, and Longitude $30^{\circ}\frac{3}{4}$ Eaſt, from *Greenwich*; according to *De la Lande*, in the *Connoiſſance des Tems, pour l'Année* 1774; allowing the Difference of the Longitude from *Ferro* 49° at *Paris* — 18° 15′ for that from *Greenwich*; the Longitude from *Ferro* being ſet down at *Paris* ſo much more.

II. *September* $6^{d}$ $1^{h}$ $59^{m}$, Morning, inviſible in *England*. Moon's Latitude 2° 30′ North. This Eclipſe is *central* and *total* in 10° North Latitude and 151° Eaſt Longitude from *Greenwich*.

Mr. *Maſkelyne* makes the Time $1^{h}$ $59^{m}$ Morning; Moon's Latitude 2′ North; eclipſed on the Meridian at $1^{h}$ $58^{m}$ in Latitude 9° North, and Eaſt Longitude $150^{\circ}\frac{1}{2}$, from *Greenwich*; according to *De la Lande*, in the *Connoiſſance des Tems, pour l'Année* 1774; allowing for the Difference of the Longitude from *Ferro* about 169° at *Paris* — 18° 15′ for that from *Greenwich*.

☞ The *Connoiſſance des Tems* (on all Occaſions) is ſeen to be a very helpful Book to Mr. *Maſkelyne*, and his Sub-Computers for executing the Office of *Aſtronomer Royal*.

*The Obliquity of the Ecliptic with the Equinoctial, in the* Nautical Ephemeris.

| | | |
|---|---|---|
| *January* | 1 . . | 23°27′ 58″.1 |
| *April* | 1 . . | *ſame* |
| *July* | 1 . . | *ſame* |
| *October* | 1 . . | 23 27 58 .3 |
| *December* | 31 . . | 23 27 58 .5 |

Theſe pretending Calculations to *Exactneſſes* are according to *Theory* and not *Practice*, and therefore not to be depended on.

If a *practical Aſtronomer* ſuppoſed this *Obliquity* to be 23° 28′, (which is all that can be meant by the foregoing *Niceties*,) how would the *Hair-Dividers* upbraid him for notorious *Error*!

N. B. *The above Obliquities are of the ſame Uſe, as much to the Purpoſe, and as infallible, as the* Maxima *of the ſeveral* (borrowed and patched-up) *aſtronomical Equations, inſerted in the* Nautical Ephemeris.

Former *practical Aſtronomers* contented themſelves with 23° 30′ *Obliquity*, till the *French* Aſtronomers, ſuppoſing their Inſtruments improved, and preſiding, as their Nation does, over *Faſhions*, firſt introduced the Mode of 23° 29′, then $23^{\circ}\ 28'\ \frac{1}{2}$, Obliquity. Afterwards, Mr. *Mayer*, ſetting up to *rival* theſe *French* Refiners, farther refined the Obliquities to the foregoing pretending Accuracies.

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## ADVERTISEMENT.

☞ *Our Correſpondents, in general, are deſired to ſend all their Letters and Productions before the End of* May *(franked or Poſt-paid); the ſooner they ſend the more they can be obliged; directed to the* Palladium-Author, *at Mr.* Cole's, Mathematical Inſtrument Maker, Fleet-ſtreet, London. —— *No Letters will be received but what are Poſt-paid.*

## NUMBER III.

## ALPHABETICAL CHRONICLE *of* REMARKABLE EVENTS.

*According to Authorities.*

*N. B. b* ſtands for *before*, and *s ſince*, *Chriſt*; or a Date without any *Mark* before it denotes *ſince Chriſt*.

A. *Bef.&ſinceChriſt.*

*Addiſon*, Rev. Launcelot, died 1703

*Ado*, Hiſtorian, died 874

*Æella* came over from Germany, and eſtabliſhed the Kingdom of South Saxony, 477, and was thus firſt King of Suſſex, died 519

*African Company* eſtabliſhed 1695

*Agricola*, Rod. aged 43, died 1485

*Anaxarchus* flouriſhed *b* 340

*Andronicus*, the peripatetic Philoſopher, flouriſhed *b* 100

*Anne Bulleyn*, 2d Wife to Henry VIII. crowned June 1, 1533, beheaded May 14 (aged 29) 1536

*Anne*, Queen to James I. died March 3, aged 44, 1619

*Arbuthnot*, Dr. born 1681, died 1735

*Arioſto*, the Italian Poet, born 1474, died 1534

*Arthur*, eldeſt Son of K. Henry VII. died Apr. 2 1502

*Athelſtan* made King of Kent by Ethelwolf 848

*Athenagoras*, the Athenian Philoſopher, flouriſhed 150

B.

*Bath* burnt 1117

*Becket*, Thomas, made Chancellor to Henry II. 1157; impeached, 1164; retired to France that Year; agreed with Henry, July 22, 1170; murdered in the Cathedral of Canterbury, Dec. 29, 1171; canonized by Alexander III. Aſh-Wedneſday 1172

*Berwick* upon Tweed burnt, 1173; again by John 1216

*Billingsgate*, great Fire at, January 13 1715

*Bœotian* War commenced, *b* 379, ended *b* 366

*Boetius*, Hiſtorian, died, about 1550

*Boileau*, French Poet, born 1630, died 1712

*Boyle*, Robert, died 1691

*Boyle*, Roger, 1ſt Earl of Orrery, born 1621, died 1679

*Braddock*, General, killed at Du-Queſne in America, July 9 1755

*Briggs*, Dr. William, died 1704

*Briggs*, Henry, (Calculator of Logarithms,) born 1556, died 1691

*Buckingham*, Duke of, beheaded at Saliſbury, November 2 1483

*Buckingham*, George Villiers, Duke of, born 1627, died 1688

*Buckingham*, John Sheffield, Duke of, born 1649, died Febr. 24 1721

*Burgundy*, Duke of, aſſaſſinated by Order of the Dauphin 1419

C.

*Cade*, Jack, killed by Alexander Iden, Sheriff of Kent 1451

*Calvin*, the Reformer, died at Geneva, aged 45, May 27 1554

*Caractacus* defeated by Ottorious Scapula, a Roman General *s* 50

*Chicheſter* burnt by Ciſſa, 1113; again 1186

*Churchill*, Rev. Charles, the Poet, born 1731, died 1764

*Coventry Act* paſſed 1669

D.

*Dacier*, Madame, a French Writer, born 1651, died 1720

*Daniel* (the Scripture Prophet) ſent Captive to Babylon, *b* 606; interpreted Nebuchadnezzar's Dream, 603; caſt into the Den of Lions, 538; from a Viſion predicted the Perſian Empire under Alexander the Great *b* 534

*Dartmouth* burnt by the French 1377

*Defoe*, Daniel, died 1731

*Derwentwater*, Earl of, and Lord Kenmuir, beheaded on Tower-hill, Feb. 24 1716

*Digby*, Sir Kenelm, born 1603, died 1665

*Dorceſter*, in Oxfordſhire, burnt, Aug. 7 1613

*Dorſet*, Thomas Sackville, Earl of, born 1556, died 1608

*Dorſet*, Charles Sackville, Earl of, born 1637, died 1706

*Dugdale*, Sir Wm, (Antiquarian,) born 1605, died Feb. 1685

*Duncan*, K. of Scots, murdered by Macbeth 1054

E.

**E.**

*Eaſt-India Company* eſtabliſhed 1689

— old Company re-eſtabliſhed 1700

*Edward* II. born at Carnarvon, in Wales, April 25, 1284; he was the firſt Prince of Wales; aſcended the Throne, July 7, 1307; married Iſabella, Daughter of France, 1308; obliged by the Barons to ſign a Commiſſion, by which he veſted the Government of the Kingdom in 12 Perſons, March 16, 1308; went to Boulogne on a Pilgrimage, Dec. 13, 1313; dethroned, Jan. 13, 1327; was ſucceeded by his eldeſt Son, Edward III. murdered at Berkley-Caſtle, Sept. 21, following, and buried in St. Peter's Glouceſter.

*Edward* III. born, at Windſor, Nov. 15, 1312; ſucceeded to the Crown, Jan. 13, 1327; crowned, at Weſtminſter, Febr. 1, following; married Philippa, Daughter of the Earl of Hainault, Jan. 24, 1328; was offered the Empire of Germany, Aug. 1348; fought in ſingle Combat with a Frenchman at Calais, and conquered, Jan. 1, 1349; died of a Cingle, at Richmond, June 21, 1377, and was ſucceeded by his Grandſon, Richard II. Son to Edward the black Prince.

*Edward the Black Prince* born June 15, 1330; brought the King of France Priſoner to England, from the Battle of Poictiers, May 24, 1357; made an Expedition in Caſtile, 1367; died, June 8, 1376.

*Edward* IV. born, 1443, elected King, March 5, 1461; crowned June 29, 1461; married Lady Eliz. Gray, Widow of Sir John Gray, at Grafton, in Buckinghamſhire, 1464; taken Priſoner by the Earl of Warwick, Mar. 1470, but eſcaped ſoon afterwards; expelled the Kingdom, 1470; returned, March 25, 1472, and reſtored; died, April 9, 1483, at Weſtminſter, and was ſucceeded by his Son, Edward V.

*Edward* V. born 1470; ſucceeded to the Crown, Apr. 9, 1483; conveyed to the Tower, May, 1483; depoſed June 20, following, and, with the Duke of York, his Brother, ſmothered in the Tower ſoon after, leaving his Uncle, Richard III. Succeſſor to the Throne.

*Edward* VI. born Oct. 12, 1537; ſucceeded to the Throne, Jan. 28, 1547; crowned, Sunday, Feb. 20, following; died of a Conſumption at Greenwich, July 6, 1553, and was ſucceeded by his Siſter Mary.

*Edwy* began his Reign in 955, aged 17; died in 959, and was ſucceeded by his Brother Edgar.

*Egbert*, the Father of the Engliſh Monarchy, began his Reign, as King of Weſtſex, 800; conquered Mercia, 828; became Sovereign of all England South of the Humber, 829; drove the Danes out of Britain, 836; died, 838; and was ſucceeded by his Son Ethelwolf.

*Elizabeth*, Queen to Henry VII. died in Childbed, Feb. 11 1503

*Elzivirs*, Dutch Printers; Lewis began to be famous, 1595; Daniel died 1681

*Emma* died (*ſee Ethelred, Canute*) 1052

*Exeter* taken by Sweyn, King of Denmark, and deſtroyed, 1003; rebelled, 1067, and was taken by William the Conqueror.

**F.**

*Falkland*, Lucius, Lord, born 1610; killed at the Battle of Newbury, Sept. 1643

*Ferrar*, Biſhop of St. David's, burnt at Carmarthen, March 30 1555

**G.**

*Galileo*, born in Italy, 1564, died 1642

*Gaveſton*, Favourite of Edward II. murdered, July 1 1312

*Gloceſter* burnt in 1102, again in 1122

*Gloceſter*, Duke of, Uncle to Richard II. ſmothered between two Feather beds, Feb. 28 1397

*Gloceſter*, Duke of, Brother to Edward IV. murdered Edward, Pr. of Wales, 1471; drowned the Duke of Clarence in a Butt of Malmſey, 1478; made

Protector of England, 1483; elected King, June 20, following. *See Richard* III.

*Gloceſter*, Duke of, Son to Queen Anne, died of a Fever, aged 11, July 29 1700

*Gregory*, James, the great Aſtronomer and Mathematician, died, aged 40 1675

*Greſham College* founded by Thomas Greſham, 1581, who died 1579

*Grey*, Lady Jane, proclaimed Queen, July 9, 1553; beheaded in the Tower, aged 17, Feb. 12 1554

*Grotius*, Hugo, born at Delft, 1586, died 1645

H.

*Hall*, one of the Murderers of the Duke of Gloceſter, hanged at Tyburn 1399

*Haman* hanged by Order of Ahaſuerus *b* 509

[illegible]iſhed *b* 403

[illegible] Succeſſion ſettled, June 12 1700

*Harfleur* taken by the Engliſh, Sept. 18 1415

*Harley*, Robert, Earl of Oxford, born, 1661, died 1724

*Haſtings* burnt by the French 1377

*Hengiſt and Horſa*, two Saxon Brothers, landed at the Iſle of Thanet 449

*Henry* II. Grandſon of Henry I. began his Reign, 1154; arrived in England, Dec. 8, and was crowned the 10th, with his Queen Eleanor, at London; crowned again at Lincoln, 1158; again at Weſtminſter, 1159; quelled the Rebellion at Maine, 1166; had his Son Henry crowned King of England, 1170; invaded Ireland and conquered it, 1172; did Penance at Becket's Tomb, July 8, 1174; took the King of Scotland Priſoner, and obliged him to give up the Independency of his Crown, 1175; named his Son John King of Ireland, 1177; had, the ſame Year a criminal Amour with Alice of France; loſt his Son Henry, June 11, 1183; made a Convention with Philip of France to go to the holy War, 1188; died with Grief at the Altar, curſing his Sons, July 6, 1189, aged 57. He was ſucceed-by his eldeſt Son, Edward I.

*Henry* III. born Oct. 1, 1207; crowned at Gloſter, Oct 28, 1216; done Homage to by Alexander King of Scotland, at Northampton, 1218; crowned again at Weſtminſter, after Chriſtmas, 1219; married Eleanor, Daughter of the Count of Provence, Jan. 14, 1236; gave his Daughter Margaret in Marriage to the King of Scots, 1252; ſhut himſelf up in the Tower for Fear of his Nobles, 1261; taken Priſoner at Lewes, May 14, 1264; wounded in the Shoulder, at the Battle of Eveſham; died with Age at St. Edmund's-bury, Nov. 16, 1272, and was ſucceeded by his eldeſt Son, Edward I.

*Henry* IV. born 1367, crowned October 12, 1399; conſpired againſt, Jan. 5, 1400; died in Jeruſalem-Chamber, Weſtminſter, May 20, 1413; was buried at Canterbury, and ſucceeded by his Son, Henry V.

*Henry* V. born 1388, crowned Apr. 9, 1413; married the Princeſs Catharine of France, May 30, 1420; entruſted with the Government of France, and declared Heir to the Crown, May 21, 1420; died of a Fiſtula at Roan, aged 33, Aug. 31, 1422; was buried at Weſtminſter, and ſucceeded by his Son, Henry VI.

*Henry* VI. born at Windſor, Dec. 6, 1421; ſucceeded to the Throne, Auguſt 31, 1422; proclaimed King of France, ditto; crowned at Weſtminſter, Nov. 6, 1429; crowned at Paris, Dec. 17, 1430; married to Margaret, Daughter of France, Apr. 22, 1445; taken Priſoner at the Battle of St. Alban's by the Duke of York, 1455; depoſed by his 4th Couſin, Edward IV. March 5, 1461, and fled to Scotland; taken Priſoner in Lancaſhire, 1463; reſtored to his Throne, 1470; taken Priſoner again by Edward, Apr. 11, 1471; died in the Tower, aged 49, in May following.

*Henry* VII. ſucceeded to to the Throne, Auguſt 22, 1485; crowned, Oct. 30, following; married Elizabeth, Daughter of Edward IV. Jan. 18, 1486; crowned his Queen, Nov. 25, 1487; married his eldeſt Daughter, Margaret, to James IV. of Scotland; died of a Conſumption, at Richmond, April 22, 1509, aged 51; and was ſucceeded by his 2d Son, Henry VIII.

*Henry* VII*th's Chapel*, its firſt Stone laid, Jan. 18 1502

*Henry* VIII. born, June 28, 1491; began to reign, April 22, 1509; married his Brother's Wife, Catharine, Infanta of Spain, June 3, 1509; crowned, June 24, following; received the Title of Defender of the Faith, 1521; ſtiled Head of the Church, 1531; divorced Queen Catharine, and married Ann Bullen, May 23, 1533; excommunicated by Pope Paul, Aug. 30, 1535; put Q. Anne to Death, and married Jane Seymour, May 20, 1536; married Anne of Cleves, Jan. 6, 1539; divorced her, July 10, 1540; married Catharine Howard, Aug. 8, following; put her to Death, Feb 12, 1542; married Cat. Par, Jul. 12, 1542; died Jan. 18, 1547; was buried at Windſor, and ſucceeded by his Son, Edward VI.

*Henry* III. King of France, murdered by a Monk, Auguſt 1 1589

*Henry*, Prince of Wales, eldeſt Son of James I. died of a Purging, aged 18, Nov. 6 1612

*Herculaneum and Pompeium*, Cities of, reduced to Aſhes 79

*Herod* began to reign in Judæa, *b* 55; put his Wife Mariamne to Death, and his Mother-in-Law Alexandrina, *b* 28; began to rebuild the Temple of Jeruſalem, *b* 18; put his two Sons to Death, by Order of the Jewiſh Council, *b* 6; died, Nov. 25 *b* 4

*Hertford*, in England, rebuilt 913

*Hillary*, St. died, aged 80 367

*Hobbes*, Thomas, (a famous Scholar,) died, aged 90 1679

*Holofernes* killed by Judith *b* 688

*Holt*, Lord Chief Juſtice, died, aged 67, March 6 1710

*Horſa (ſee Hengiſt)* ſlain by Vortimer 455

*Horſe-Guards* inſtituted 1550

*Hoſpital*, St. Bartholomew's, founded by Henry VIII. 1539; Chriſt's, by Edward VI. 1552; Bridewell and Bethlehem, by Ditto; 1553; St. Thomas's, by Ditto, 1553; London-Workhouſe, 1611; for French Proteſtants, incorporated, 1718; Guy's, by Thomas Guy, Eſq. 1722; Weſtminſter Infirmary inſtituted, 1720; incorporated, 1739; London, inſtituted, 1740; Ditto incorporated, 1758; Middleſex, inſtituted, 1745; Small-Pox, Sept. 26, 1746; Lock, 1746; Corporation for ſick, &c. Seamen, incorporated, June 24, 1747; Britiſh Lying-in, inſtituted, Nov. 1749; London Lying-in, Mar. 30, 1750; St. Luke's, 1751; Magdalen and Aſylum, inſtituted, 1758.

*Hotham*, Sir John, and his Son, beheaded, Jan. 1 1645

## I.

*Idolatry* firſt aboliſhed from Kent by Ercombert, who began his Reign 640

*Ilium* burnt, *b* 1359, 64 Years before the Argonautic Expedition.

*Innocent* XI. Pope, died, Auguſt 2 1689

*Jacob* returned into the Land of Canaan, *b* 1739; went with his Family into Egypt, *b* 1706, died, aged 147, *b* 1689

*James* I. King of Scotland, murdered 1487

*James* I. born, at Edinburgh, *June* 19, 1566; crowned King of Scotland, Auguſt, 1567; married the Princeſs of Denmark, 1589; ſucceeded to the Crown of England, March 24, 1603; arrived at London, May 7, following; went into Scotland, March 4, 1617; returned the September following; loſt his Queen, Mar. 3, 1619; died of an Ague, Mar. 27, 1625; and was ſucceeded by his ſecond Son, Charles I.

*James* II. born Oct. 30, 1633; married Mrs. Anne Hyde, Sept. 3, 1660; married the Princeſs of Modena, Nov. 21, 1673; ſucceeded to the Throne, Feb. 6, 1685; fled from his Palace, Dec. 12, 1688; was ſeized ſoon after at Feverſham, and brought back to Whitehall; left England, Dec. 23, following; landed with an Army at Kinſale, in Ireland, Mar. 22, 1689; returned to France, June, 1690; died at St. Germain's, Sept. 6 1701

*Jane Seymour*, Wife to Henry VIII. died in Childbed, Oct. 1538

*Jeptha* took his raſh Vow, *b* 1187; died *b* 1182

*Jeremiah* began to prophecy, *b* 629; wrote his Lamentations, *b* 610; impriſoned, *b* 609; foretold the Jewiſh Captivity, *b* 607; died about *b* 577

*Jeſuits Society* eſtabliſhed by Ignatius s 1536

*Jeſus*, Son of Sirach, lived *b* 247

*Jews* maſſacred, Sept. 3, 1189; Numbers executed for clipping, 1278; totally expelled England 1290

*John*, St. the Evangeliſt, put into a Cauldron of boiling Oil, but taken out unhurt, 93; wrote his Revelations, 96; his Goſpel, 97; died, aged 91, Dec. 27 99

*John*, the Baptiſt, preached Repentance in the Wilderneſs, 28; impriſoned, 30; died 32

*Jones*, Inigo, born about 1572; died 1652

## K.

*Kilmarnock*, Lord, and Lord Balmerino, beheaded on Tower-hill, Auguſt 1746

## L.

*Leiceſter* Town burnt by the King's Command 1173

*Lenox*, Earl of, Regent of Scotland, murdered 1571

*Lent*, the Faſt of, firſt eſtabliſhed in Kent by Ercombert, about 640

*Lewis* Philip of France's Son, laid Claim to the Crown of England, and landed with an Army in the Iſle of Thanet, May 23 1216

*Leyden* Univerſity founded 1575

*Longbeard*, William Fitz Oſbert, a Lawyer ſo called, a notorious Ruffian, hanged at Tyburn in 1197

*Lovat*, Lord, beheaded on Tower-hill 1746

## M.

*Malmſbury*, William of, wrote in 1140

*Malta*, Knights of, eſtabliſhed 1113

*Mary*, Queen, born, 1516; proclaimed, July 19, 1553; crowned Sep. 30 following; married Philip of Spain, Jan. 19, 1554; died of a Dropſy, Nov. 17, 1558; was ſucceeded by her Siſter Elizabeth.

*Mary*, Queen of Scots, fled to England, May 16, 1568; impriſoned in Tilbury-Caſtle, Jan. 1569; removed to Fotheringay, 1586; there beheaded, aged 44. F.S.

*Mary*, William's Queen, born April 30, 1662; proclaimed, with her Huſband, Queen of England, Feb. 13, 1689. (*See William* III.) Died of the Small-Pox.

*Matilda*, Stephen's Queen, crowned Eaſter-day, 1136; died, May 3, 1151, at Hennigham-Caſtle, Eſſex, and buried in a Monaſtery at Feverſham.

*Maude*, Daughter of Henry I. married to Henry IV. Emperor of Germany, 1109; her Right to ſucceed her Father ſworn to by the Engliſh, 1127; married to the Earl of Anjou the ſame Year; ſet aſide from the Succeſſion, 1136; landed in England, and claimed her Right to the Crown, Sept. 1139; crowned, but ſoon after defeated at Wincheſter, 1141; eſcaped to Glouceſter in a Bier; fled from a Window of Oxford-Caſtle, by a Rope, in the Winter, 1142; retired to France, in Lent, 1147; came to England, and made a laſting Peace with Stephen, in 1153; died abroad, Sept. 10 1167

*Maximilian*, the Emperor, enliſted as a Subject and Captain under Henry VIII. when he invaded France in 1513

*Menander*, the Athenian, born 342

*Merlin*, the Prophet, lived in 477

*Milo* baniſhed for killing Clodius *b* 52

*Miſſiſippi* Scheme 1720

*Mortimer*, Roger, Earl of March, hanged at Tyburn, Nov. 29 1330

*Mortmain* Act paſſed, Nov 29 1279

*Murray*, Earl of, Regent of Scotland, aſſaſſinated, Jan. 23 1570

## N.

*Newcaſtle* on Tyne founded by Robert, Son to

William the Conqueror, in 1081; burnt to the Ground by Accident 1349

*Normandy (ſee Rollo)* invaded on all Hands in 1117

*Normans* maſſacred at Durham 1069

*Northampton* burnt by Accident, Sep. 3 1675

*Nottingham* burnt to Aſhes 1148

### O.

*Orange*, Prince of, born Nov. 4, 1650; created Stadtholder, July 3, 1672; married the Princeſs Mary of England, Nov. 4, 1677; landed at Torbay, in England, with an Army, Nov. 5, 1688; declared King of England, Feb. 13, 1689. *(See William* III.)

*Orpheus*, the Poet of Crotona, flouriſhed *b* 576

*Otway*, Thomas, (Poet,) born 1651

### P.

*Partridge*, John, (Aſtrologer and Almanac-Maker,) died 1715

*Paſſover* inſtituted, Monday, May 4 *b* 1491

*Paul*, St. converted, 33; caught up into the 3d Heaven, 44; viſited Athens and Corinth, 50; wrote his 1ſt Epiſtle to the Corinthians, and that to the Gallatians, 51; returned to Epheſus, 52; wrote his 1ſt Epiſtle to the Theſſalonians, 52; his ſecond, 53; put into Bonds and brought to Rome, 55; wrote his 2d Epiſtle to the Corinthians, and that to the Romans, 58; thoſe to the Philippians, Epheſians, Coloſſians, and Philemon, 62; that to the Hebrews, 63; his 1ſt to Timothy and that to Titus, 65; his 2d to Timothy, 66; died, June 29 67

*Perſecution* by the Jews, the 1ſt in 33; ſecond, 44; firſt general, of the Chriſtians, under Nero, 64; 2d ditto, under Domitian, 93; 3d ditto, under Trajan, 107; 4th ditto, under Marcus Aurelius, 164; 5th ditto, under Severus, 202; 6th ditto, under Maximinus, 235; 7th ditto, under Decius, 250; 8th ditto, under Valerian, 257; 9th ditto, under Aurelian, 272; 10th ditto, under Diocleſian, 302; 11th ditto, by the Arians, under Conſtantinus, 337; 12th ditto, under Julian the Apoſtate 361

*Perſius* born, Dec. 4, 42; died, aged 28.

*Peterborough* burnt 1117

*Philip* of Macedon murdered by Pauſanias *b* 336

*Philippa*, Queen of England, died at Windſor, Aug. 15, 1369; and was buried at Weſtminſter.

*Plantagenet*, Geoffry, Earl of Anjou, married the Empreſs Maud, 1127; invaded Normandy 1137

*Pole*, Cardinal, died, aged 58, Nov. 18 1558

*Porteus*, Captain, put to Death by the Mob at Edinburgh, Sept. 7, 1736

*Pyrrhus* began to reign at Epirus, 295; wounded in the Battle with the Romans, in which he loſt 20000 Men, they 5000; killed, as he was fighting, by a Woman's throwing a Tile at his Head *b* 272

### Q.

*Quevedo*, Don, a famous viſionary Spaniſh Author, died 1647

### R.

*Raphael* (a famous Painter) born at Urbin, 1483; died 1520

*Rebellion* of the Engliſh againſt William Rufus, in Favour of his Brother Robert, 1088; extinguiſhed 1090

— of the Welch, who defeated the Normans and Engliſh 1095

— of the Engliſh, under Wat Tyler, June 12 1381

— of the Barons 1387

— of the Engliſh and Welch 1400

— of Jack Cade, in Favour of the Duke of York 1450

— of the Engliſh 1469

— Ditto 1536

— Ditto 1549

— of Wyat 1554

— in the North 1569

— of the Iriſh, under Tyrone 1599

— of the Scotch 1639

— of the Iriſh 1641

— of the Scotch 1666

— under Monmouth, June 11 1685

— of the Scotch, under the Pretender 1715

— Ditto 1745

*Richard* I. born at Oxford, 1157; crowned at London, Sept. 3, 1189; ſet out on the Cruſade, and joined Philip of France on the Plains of Vezelay, June 29, 1190; took

Meſſina the latter End of the Year; married Barengaria, Daughter of the King of Navarre, ſhe being with them, May 12, 1191; defeated the Cyprians, 1191; taken Priſoner near Vienna, on his Return Home, by the Duke of Auſtria, Dec. 20, 1192; ranſomed, and ſet at Liberty, Feb. 4, 1194. When he gained a Victory over the French at Giſors, about this Time, *Not we*, (ſays he), *but Dieu et mon Droit*, (i. e.) *God and my Right, have obtained this Victory*; ever ſince which the Kings of England have made it their Motto. He returned to Engl. Mar. 20, following; wounded in the Shoulder, abroad, with an Arrow, at the Caſtle of Chaluz, near Limoges, which mortifying, he died, April 6, 1193, and was ſucceeded by his Brother John.

*Richard* II. born at Bourdeaux, Jan. 6, 1367; made Guardian of the Kingdom, Auguſt 30, 1372; created Prince of Wales, 1376; ſucceeded his Grandfather, Edward III. June 21, 1377; crowned at Weſtminſter, July 16, following; married to Anne, Siſter to the Emperor of Germany, Jan. 14, 1382; buried his Queen, Auguſt 3, 1394; married Iſabella, Daughter of France, Autumn, 1396; taken Priſoner by Henry, Duke of Lancaſter, and ſent to the Tower, Sep. 1, 1339; reſigned his Crown, Sept. 28, following, and was ſucceeded by his firſt Couſin, Henry IV. Duke of Lancaſter, Grandſon to Edward III. murdered in January, 1400, at Pomfret-Caſtle; buried at Langley, but afterwards removed to Weſtminſter.

*Richard* III. elected King, June 20, 1483; crowned, July 6, following; ditto at York, Sep. 8; ſlain at the Battle of Boſworth, Auguſt 22, 1485, aged 32; and was ſucceeded by his Couſin, Henry VII. He was buried at Leiceſter.

*Richmond*, Counteſs of, Henry VIII.'s Grandmother, died 1509

*Rupert*, Prince, died, aged 62, Nov. 29 1682

*Rye* burnt by the French 1377

S.

*Samnite* War ended, after 71 Years Continuance *b* 272

*Sandwich* burnt 1217

*Sarah*, Abraham's Wife, died, aged 127 *b* 1859

*Sardis*, City of, taken and burnt by the Athenians *b* 504

*Scævola*, Mutius, burnt his right Hand, before Porſenna, for having accidentally killed his Secretary, when he deſigned to have ſlain him *b* 508

*Schomberg*, Duke of, landed in Ireland, near Carrickfergus, with an Army, Aug. 13, 1689; killed at the Battle of the Boyne 1690

*Shafteſbury* built by Alfred 879

*Simpſon*, Thomas, the Mathematician, died 1761

*Society*, Royal, inſtituted, Dec 30, 1660; incorporated, 1663; for Reformation of Manners, form'd 1698; for Promotion of Chriſtian Knowledge, eſtabliſhed 1699; for the Propagation of the Goſpel, incorporated 1701; Antiquarian, Nov. 2, 1751; Arts and Sciences, inſtituted, 1753; Marine, eſtabliſhed 1756

*Somerſet-houſe* built by the Duke of Somerſet, Protector 1549

*South*, Rev. Dr. Robert, born, 1633; died 1710

*Spencers*, Father, Son, and Grandſon; the Father hanged at Briſtol, aged 90, in Oct. 1326; the Son hanged at Hereford, Nov. 24, following; the Grandſon beheaded at Briſtol 1400

*Spinoſa*, Benedict, (an atheiſtical Author,) died at the Hague, aged 44 1677

*Stafford*, Lord, beheaded through the Perjury of falſe Witneſſes, Dec. 29 1680

*Statius* born, about 41; died about 102

*Stephen*, the firſt Martyr, ſtoned, Dec. 26 33

*Stephen*, King, crowned, Dec. 2, 1135; defeated and taken Priſoner at Lincoln by the Earl of Gloceſter, Maude's Brother, Feb. 1141; and put in Irons at Briſtol-Priſon, but releaſed, on an Exchange for the Earl of Gloceſter, who was taken

Priſoner at Wincheſter; made Peace with Henry, Maude's Son, in 1153; died of the Piles, Oct. 25, 1154, aged 50; was buried at Feverſham, and ſucceeded by his Couſin, Henry II. Duke of Normandy, Son of Maude by the Earl of Arjou.

*Stockholm*, City of, began to be built 1253

*Strafford*, Earl of, beheaded on Tower-hill, aged 48, May 12 1641

*Stratford* upon Avon burnt, Aug. 1 1614

*Suetonius Paulinus*, in the Reign of Nero, invaded the Iſle of Angleſey, and burnt the Druids, 59; defeated Boadicea at London, and ſlew 80000 of the Britons, the ſame Year.

*Sulpitius*, the Hiſtorian, died 420

*Sweyn*, King of Denmark, drove Etheldred II. from his Kingdom, 1013; but was killed, February 2, 1013, at Gainſborough, and was buried at York.

*Swithin*, Biſhop of Wincheſter, died 854

T.

*Temple*, Sir Wm, died, aged 69, Jan. 1699

*Thebes*, the City of, rebuilt by Caſſander, *b* 315, 20 Years after it had been deſtroyed.

*Themiſtocles*, the Athenian General, died, aged 65 *b* 449

*Theodoſius the Great* made his Entry into Conſtantinople, 380; died, aged 60 395

*Theophraſtus* born at Litbon, *b* 322; died *b* 288

*Thetford* (in Norfolk) burnt by the Danes in 1010

*Thiſtle*, the Order of the, founded, 812; revived 1705

*Thorp*, Speaker of the H. of Commons, murdered by the Mob 1460

*Titian*, Venetian Painter, born, 1477; died 1576

*Torquatus*, Manlius, cauſed his own Son to be put to Death, for fighting contrary to his Orders, though he gained an Advantage over the Enemy *b* 340

*Tribunes* of the People inſtituted at Rome, 495; military, with conſular Power, created *b* 445

*Trump*, Van, the Dutch Admiral, killed in an Engagement, July 29 1653

*Tyrrell*, Admiral, died of an Apoplexy, at Sea, in his Paſſage from Antigua to England, onboard the Princeſs Louiſa Man of War, June 26 1766 *See Pal.* 1767, *p.* 68.

V.

*Vanini*, at Thoulouſe, died a Martyr to Atheiſm, aged 33, who was burnt Feb. 19 1619

*Venables*'s Expedition to America, Dec. 4 1654

*Virgil*, Polydore, died, aged 80 1555

*Vortigern* made King of Britain, 447; depoſed, 455; reaſſumed the Crown, 457; depoſed again 465

*Vortimer*, Son of Vortigern, ſucceeded to the Government of Britain, 455; died 457

W.

*Wales* conquered, and divided among the Conquerors, 1095; again completely conquered and annexed to the Crown of Eng. 1283

*Waller*, Edmund, the Poet, died, aged 81 1687

*War* with Scotland, 1068; Peace with Ditto 1091

— with France, 1113; again, 1116; Peace with Ditto 1118

— with Scotland 1139

— with France, 1161; Peace with Ditto 1186

— again, with Succeſs, in France, 1194; Peace with Ditto 1195

— with France 1201

— civil, renewed 1215

— ended 1216

— with France 1225

— ended 1243

— civil 1262

— ended 1267

— with France 1294

— with Scotland, 1296; Peace with France, 1299; Ditto with Scotland, Mar. 30 1323

— again with Scotland 1327

— ended 1328

— again with Scotland 1333

— with France, 1339; Peace with France, May 8 1360

— with France 1368

— civil, 1400; Peace with France, May 31 1420

— with France, 1422; civil, between York and Lancaſter, 1452; Peace with France, Oct. 1471

— civil 1486

— with France, Oct. 6, 1492; Peace with Ditto, Nov. 3, following; Peace with Scotland 1542

— with Scotland directly after; Peace with France and Scotland, June 7 1546

— with Scotland 1547

*War* with France, 1549; Peace with both, Mar. 6 1550

— civil 1553

— with France, June 7 1557

— with Scotland, 1557; Peace with France, April 2, 1559; with Scotland 1560

— with France, 1562; Peace with Ditto 1564

— with Scotland 1570

— with Spain, 1588; Peace with Spain, Aug. 18 1604

— with Spain 1624

— with France, 1627; Peace with Spain and France, Apr. 14 1629

— civil 1642

— with the Dutch, 1651; Peace with Ditto, Apr. 5 1654

— with Spain, 1655; Peace with Ditto, Sep. 10 1660

— with France, Jan. 26 1666

— with Denmark, Oct. 19, following; Peace with France, the Danes, and the Dutch, Aug. 24, 1667; Ditto with Spain, Feb. 13 1668

— with the Algerines, Sept. 6, 1669; Peace with Ditto, Nov. 19 1671

— with the Dutch, Mar. 1672; Peace with Ditto, Feb. 28 1674

— with France, May 7, 1689; general Peace, Sept. 26 1697

— with France, May 4, 1702; Peace of Utrecht, May 13 1713

— with Spain, Dec. 1718; Peace with Ditto 1721

— with Spain 1719

— with France, March 31, 1744; Peace with France, &c. 1748

— with France 1756

*War* with Spain, Jan. 4, 1761; Peace with France and Spain, Feb. 10 1765

*William* I. Duke of Normandy, paid a Viſit to Edward the Confeſſor in England, 1051; betrothed his Daughter to Harold II. 1058; made a Claim of the Crown of England, 1068; invaded England by landing at Pevenſey in Suſſex; defeated the Engliſh at Haſtings, October 14, 1066, where King Harold was ſlain; crowned at Weſtminſter, Dec. 26; invaded Scotland, 1072; ſubverted the Engliſh Conſtitution, 1074; wounded by his Rebel Son Robert, at Gerberot in Normandy, 1079; invaded France, 1088; ſoon after which he fell from his Horſe and contracted a Rupture, of which he died at Hermentrude, near Roan, aged 63; he was buried at Caen, and was ſucceeded, in Normandy, by his eldeſt Son Robert, and in England by his 2d Son, William II.

*William* II. crowned at Weſtminſter, Sept. 27, 1088; invaded Normandy, 1090, with Succeſs; killed by Accident, as he was hunting in the new Foreſt, by Sir Walter Tyrrel, Auguſt, 1100, aged 40; he was buried at Wincheſter, and ſucceeded by his Brother, Henry I.

*William* III. crowned with his Queen, April 11, 1689; landed at Carrickfergus, June 14, 1690; fell from his Horſe and broke his Collar-bone, Feb. 21, 1702; died, aged 51, March 8, and was buried Apr. 12, following, and left his Siſter-in-Law, Anne, Succeſſor to the Throne.

*Wincheſter* burnt 1102

*Windſor-Caſtle* built by Edward III. 1344

*Woburn*, in Bedfordſhire, burnt 1724

*Wolſey* appointed Miniſter to Henry VIII. in 1513; Archbiſhop of York, 1514; Cardinal, 1515; Chancellor, Dec. 24, following; appointed Legate, 1518; reſigned the Seals, Oct. 18, 1529; ſtripped of all his Dignities and Offices the November following; and died, Nov. 28, 1530, aged 59.

*Worceſter* City burnt 1113

### Y.

*York*, Richard, Duke of, made Protector of this Kingdom, March 27, 1454; declared right Heir to the Crown, 1460; ſlain at the Battle of Wakefield 1460

### Z.

*Zeuxis*, the Painter, flouriſhed b 468

*⁎* *The foregoing* three Chronicles, *in* Pal. *for* 1772, 1773, & 1774, *are a Plan for forming a* Chronological Dictionary, *as near the Truth as poſſible; which is a Book worthy the Bookſellers undertaking, as no Book is more wanted, for its Uſefulneſs, in the whole Republic of Literature and Science.*

## EMPERORS *of* ROME, *from the Foundation thereof,* 753 *Years before* Chriſt.

| *Began to reign.* *Yrs. b. Xt.* | | *Reigned.* *Y.* | *M.* | *D.* |
|---|---|---|---|---|
| 753 | Romulus, *firſt King* | 37 | 0 | 0 |
| 716 | *Interregnum* of more than | 1 | 0 | 0 |
| 715 | Numa Pompilius | 43 | 0 | 0 |
| 672 | Tullus Hoſtilius | 22 | 0 | 0 |
| 669 | *The Battle of the Horatii & Curatii.* | | | |
| 640 | Ancus Martius | 24 | 0 | 0 |
| 616 | Tarquin *the elder* | 38 | 0 | 0 |
| 578 | Servius Tullius | 44 | 0 | 0 |
| 534 | Tarquin *the Proud* | 25 | 0 | 0 |
| 509 | *The Republic of Rome for* | 478 | 0 | 0 |
| 46 | Julius Cæſar, *Emperor* | 15 | 0 | 0 |
| 31 | Auguſtus | 44 | 0 | 0 |
| s.14 | Tiberius | 22 | 6 | 23 |
| 37 | Caligula | 3 | 10 | 8 |
| 41 | Claudius | 13 | 8 | 19 |
| 54 | Nero | 13 | 7 | 28 |
| | *L. Clodius Macer. Tyran.* | | | |
| 68 | Galba | 0 | 7 | 0 |
| 69 | Otho | 0 | 3 | 0 |
| 69 | Vitellius | 0 | 8 | 5 |
| 69 | Veſpaſian | 9 | 11 | 24 |
| 79 | Titus | 2 | 2 | 20 |
| 81 | Domitian | 15 | 0 | 5 |
| 96 | Nerva | 0 | 16 | 8 |
| 98 | Trajan | 19 | 6 | 15 |
| 117 | Adrian | 20 | 11 | 0 |
| 138 | Antonius Pius | 22 | 7 | 26 |
| 161 | M. Aurel. | 19 | 10 | 0 |
| 161 | L. Verus | 9 | 0 | 0 |
| 180 | Commodus | 12 | 9 | 14 |
| 193 | Pertinax | 0 | 2 | 28 |
| 193 | Didius Julianus | 0 | 2 | 5 |
| 193 | Peſcenius Niger | 1 | *& more.* | |
| | *Clodius Albinus.* | | | |
| 193 | S. Severus | 17 | 8 | 3 |
| 211 | M. Aurel. Antoninus | 6 | 2 | 4 |
| 211 | P. Septimus Geta | 1 | 0 | 0 |
| 217 | M. Apel. Sev. Macrinus | 1 | 1 | 27 |
| 218 | M. Aur. Ant. Elagabalus | 3 | 9 | 4 |
| 222 | Alexander Severus | 13 | 0 | 0 |
| | *Vranius Tyran.* | | | |
| 235 | C. Jul. Verus Maximus | 3 | 0 | 0 |
| 237 | M. A. G. Africanus, *elder* | 0 | 2 | 0 |
| | M. A. G. Afric. *younger* | | | |
| 237 | Pupienus & Balbinus | 1 | 0 | 0 |
| 238 | Gordian III. | 5 | 8 | 0 |
| 244 | Philippus, *Father* | 5 | 0 | 0 |
| | Philippus, *Son* | | | |
| | T. Jul. Mar. Pacatianus | | | |
| | P. Servilius Marinus | | | |
| 249 | Decius | 2 | 0 | 0 |
| | Herennius, Etruſcus | | | |

| *Began to reign.* *Yrs. s. Xt.* | | *Reigned.* *Y.* | *M.* | *D.* |
|---|---|---|---|---|
| 251 | Hoſtilianus | 0 | 18 | 0 |
| | *L. Priſcus Tyran.* | | | |
| | *Jul Valenſ. Tyran.* | | | |
| | *M. Aufidius Perpenna, Tyran.* | | | |
| | Trebonianus Gallus | | | |
| | Vibius Voluſianus | | | |
| 253 | C. Jul. Æmilianus | 0 | 3 | 0 |
| 253 | Licin. Valerianus, *Father* | 0 | 7 | 0 |
| 253 | Lic. Egnat. Gallienus, *Son of Valerianus, alone* | 8 | 0 | 0 |
| | Licin. Valerianus, *Son of Valerianus* | | | |
| | Licin. Saloninus, *Son of Gallienus* | | | |
| | Sulpitius Antoninus | | | |
| 268 | M. Aur. Clau. Gothicus | 2 | 0 | 0 |
| | Quintillus, *Bro. of Claud.* | 0 | 0 | 17 |
| | Domit. Aurelianus | 4 | 9 | 0 |
| | *Firmius, Tyrant in Egypt.* | | | |
| | *Tetricus, Tyrant among the Greeks.* | | | |
| | Athenodorus | | | |
| | Heroias, Vabalathus | | | |
| | A. Septimus | | | |
| 275 | *Interregnum of* | 0 | 8 | 0 |
| 275 | Tacitus | 0 | 7 | 0 |
| 276 | Florianus | 0 | 3 | 0 |
| 276 | Probus | 6 | 4 | 0 |
| | *Saturninus, Proculus, Bonoſius.* | | | |
| 282 | M. Aurel. Carus | | | |
| | M. Aurel. Carinus | | | |
| | Numerianus | 2 | 0 | 0 |
| 284 | *M. Aur. Julian. Sabrinus.* | | | |
| | Diocleſian & Max. Herc. | 20 | 5 | 13 |
| | *Selvius, Amandus, Pomponius, Ælianus, Carauſius, Allectus, Epideus Achilleus, Domitius, Dometrianus, Tyrants.* | | | |
| 305 | Conſtan. Clorus, & | 0 | 15 | 0 |
| | Galer. Val. Maximianus | 6 | 0 | 0 |
| | Flav. Valer. Severus | | | |
| | C. Gal. Val. Maximinus | | | |
| | M. Aur. Val. Maxentius | | | |
| | *Alexander, Tyrant.* | | | |
| | P. Val. Lic. Licinius Cæſar | | | |
| | *Valerius Valens* | | | |
| | *Martinianus* | | | |
| 337 | Conſtantine *the great* | 30 | 9 | 28 |
| | — *younger*, died in 340 | 3 | 0 | 0 |
| | Conſtance | 24 | 5 | 12 |
| | *Saturnius* | | | |
| | Conſtant | 13 | 0 | 0 |
| | *Magnentius & Nepotianus, Vetranion & Sylvanus, Tyrants.* | | | |
| 361 | Julian the *Apoſtate* | 1 | 7 | 23 |
| 363 | Jovian, *Emperor* | 0 | 7 | 20 |

*After this Time the Roman Empire was divided into Eaſtern & Weſtern.*

*The* firſt *and* laſt KINGS *of foreign* KINGDOMS, *as far as they are known.*

*Began to reign.* FRANCE.

414 Clodion.
1715 Lewis XV. born February 15, 1710.

HUNGARY. BOHEMIA.

373 Attila. 1086 Wratiſlas II. had firſt the Title of King.

The two Kingdoms united, 1612, under Matthias.

Maria Tereſa, Dowager Empreſs of Germany, born May 13, 1717.

ORANGE. William V. born March 8, 1748.

POLAND.

999 Boleſlaus had firſt the Title of King.
1764 Staniſlaus, born January 17, 1732.

PRUSSIA.

1700 Frederic.
1740 Frederic III. born January 24, 1712.

SWEDEN.

481 Swartmanus.
Adolphus Frederic, born May 14, 1710.

DENMARK. NORWAY.

714 Gormo. 998 Suenon.

The two Kingdoms united under Eric IX. in 1412.

1766 Chriſtian VII. born January 29, 1749.

PORTUGAL.

1088 Henry, firſt Earl.
1112 Alphonſo, the firſt who had the Title of King.
1750 Joſeph, born June 6, 1714.

CASTILE. ARRAGON.

1033 Ferdinand. 1034 Ramerus.

The two Kingdoms united under Philip I. of Auſtria, in 1504, and called

SPAIN.

1759 Charles III. born January 20, 1716.

GERMANY.

843 Lewis, the firſt King.
900 Hugh, the firſt Emperor.
1765 Joſeph Benedict, born March 13, 1741.

RUSSIA.

1533 John Baſilowitz, the firſt Czar.
1762 Catharine II. born March 28, 1729.

SARDINIA.

1730 Emanuel III. born April 27, 1701.

NAPLES and SICILY.

1102 Roger.
1759 Ferdinand IV. born January 12, 1751.

ROME.

1769 Clement XIV. born October 31, 1705.

CONSTANTINOPLE.

1298 Ottoman.
1757 Muſtapha III. born December 21, 1715.

VENICE.

697 P. L. Anafeſtus, the firſt Doge.
1765 Francis Marc Gaeton.

LORRAIN.

958 Frederic, the firſt Duke.

SAVOY.

1103 Amadeus, the firſt Earl.
1188 Thomas, the firſt Duke. The preſent Duke is King of Sardinia.

## A SHORT GRAMMATICAL TABLE *of the* RADICALS *and* ENDINGS *of the* FOUR USUAL PATTERN LATIN VERBS, *for the* FORMATION *of all regular* LATIN VERBS, *active and paſſive, through the four* CONJUGATIONS.

### ACTIVE VOICE.

#### I. CONJUGATION.

| | | | |
|---|---|---|---|
| Ind. | 1. Am-o. | 11. Amáv-ero. | |
| | 2. Amá-bam. | 12. Am-áre. | *Infinitive.* |
| | 3. Amáv-i. | 13. Amav-íſſe. | |
| | 4. Amáv-eram. | 14. Amatú-rum eſſe vel fuiſſe. | |
| | 5. Amá-bo. | 15. Amán-di, do, dum. | *Gerunds.* |
| Imp. | 6. Am-a. | 16. Amát-um, | *Supines.* |
| Pot. | 7. Am-em. | 17. Amát-u, | |
| | 8. Amá-rem. | 18. Am-ans, | *Participles.* |
| | 9. Amáv-erim. | 19. Amát-us, | |
| | 10. Amav-íſſem. | 20. Amatú-rus, | |
| | | 21. Amán-dus, | |

#### II. CONJUGATION.

| | | | |
|---|---|---|---|
| Ind. | 1. Doc-eo. | 11. Docu-ero. | |
| | 2. Docé-bam. | 12. Doc-ére. | *Infinitive.* |
| | 3. Docu-i. | 13. Docu-íſſe. | |
| | 4. Docu-eram. | 14. Doct-úrum eſſe vel fuiſſe. | |
| | 5. Docé-bo. | 15. Docén-di, do, dum. | *Gerunds.* |
| Imp. | 6. Doc-e. | 16. Doct-um, | *Supines.* |
| Pot. | 7. Doce-am. | 17. Doct-u, | |
| | 8. Docé-rem. | 18. Doc-ens, | *Participles.* |
| | 9. Docu-erim. | 19. Doct-us, | |
| | 10. Docu-íſſem. | 20. Doctú-rus, | |
| | | 21. Docén-dus, | |

#### III. CONJUGATION.

| | | | |
|---|---|---|---|
| Ind. | 1. Leg-o. | 11. Leg-ero. | |
| | 2. Legé-bam. | 12. Lég-ere. | *Infinitive.* |
| | 3. Leg-i. | 13. Leg-íſſe. | |
| | 4. Lég-eram. | 14. Lect-úrum eſſe vel fuiſſe. | |
| | 5. Leg-am. | 15. Legén-di, do, dum. | *Gerunds.* |
| Imp. | 6. Leg-e. | 16. Lect-um, | *Supines.* |
| Pot. | 7. Leg-am. | 17. Lect-u, | |
| | 8. Lége-rem. | 18. Leg-ens, | *Participles.* |
| | 9. Lége-rim. | 19. Lect-us, | |
| | 10. Leg-íſſem. | 20. Lectú-rus, | |
| | | 21. Legén-dus, | |

#### IV. CONJUGATION.

| | | | |
|---|---|---|---|
| Ind. | 1. Audio. | 11. Audiv-ero. | |
| | 2. Audié-bam. | 12. Aud-íre. | *Infinitive.* |
| | 3. Audív-i. | 13. Audiv-íſſe. | |
| | 4. Audív-eram. | 14. Audit-úrum eſſe vel fuiſſe. | |
| | 5. Audi-am. | 15. Audien-di, do, dum. | *Gerunds.* |
| Imp. | 6. Aud-i. | 16. Audít-um, | *Supines.* |
| Pot. | 7. Audi-am. | 17. Audít-u, | |
| | 8. Audí-rem. | 18. Aud-iens, | *Participles.* |
| | 9. Audív-erim. | 19. Audít-us, | |
| | 10. Audiv-íſſem. | 20. Auditú-rus, | |
| | | 21. Audien-dus, | |

PASSIVE

## PASSIVE VOICE.

### I. Conjugation.

Ind. 1. Am-or.
2. Amá-bar.
3. Amát-us ſum vel fui.
4. Amát-us eram vel fueram.
5. Amá-bor.
Imp. 6. Am-áre.
Pot. 7. Am-er.
8. Amá-rer.
9. Amát-us ſim vel fuerim.
10. Amát-us eſſem vel fuiſſem.
11. Amát-us ero vel fuero.
12. Am-ári. *Infinitive*
13. Amát-um eſſe vel fuiſſe.
14. Amát-um iri.

### II. Conjugation.

Ind. 1. Doce-or.
2. Docé-bar.
3. Doct-us ſum vel fui.
4. Doct-us eram vel fueram.
5. Docé-bor.
Imp. 6. Doc-ére.
Pot. 7. Doce-ar.
8. Docé-rer.
9. Doct-us ſim vel fuerim.
10. Doct-us eſſem vel fuiſſem.
11. Doct-us ero vel fuero.
12. Doc-éri. *Infinitive.*
13. Doct-um eſſe vel fuiſſe.
14. Doct-um iri.

### III. Conjugation.

Ind. 1. Leg-or.
2. Legé-bar.
3. Lectus ſum vel fui.
4. Lectus eram vel fueram.
5. Leg-ar.
Imp. 6. Lég-ere.
Pot. 7. Leg-ar.
8. Lége-rer.
9. Lect-us ſim vel fuerim.
10. Lect-us eſſem vel fuiſſem.
11. Lect-us ero vel fuero.
12. Leg-i.
13. Lect-um eſſe vel fuiſſe.
14. Lect-um iri.

### IV. Conjugation.

Ind. 1. Aud-ior.
2. Audié-bar.
3. Audít-us ſum vel fui.
4. Audít-us eram vel fueram.
5. Audi-ar.
Imp. 6. Aud-íre.
Pot. 7. Audi-ar.
8. Audí-rer.
9. Audít-us ſim vel fuerim.
10. Audít-us eſſem vel fuiſſem.
11. Audít-us ero vel fuero.
12. Aud-íri. *Infinitive.*
13. Audít-um eſſe vel fuiſſe.
14. Audít-um iri.

*References to the Moods, Tenſes, and Perſons, by the ſame Numbers. Active and Paſſive Voice.*

1. Indicative Mood, Preſent Tenſe.
2. —— Preterimperfect ——
3. —— Preterperfect ——
4. —— Pluperfect ——
5. —— Future ——
6. Imperative Mood.
7. Potential (Optative and Subjunctive) Mood, Preſent Tenſe.
8. Potential, Preterimperfect Tenſe.
9. —— Preterperfect ——
10. —— Pluperfect ——
11. —— Future ——
12. Infinitive Mood, Preſent and Preterimperfect.
13. —— Preterperfect and Pluperfect.
14. —— Future.

15. Gerunds.
16 & 17. Supines.
18. Participle of the preſent Tenſe.
19. —— Preterperfect in us.
20. —— Future in rus.

*Theſe References belong to the Active Voice only.*

21. —— Future in dus. *Paſſive Voice only.*

P. 24. Againſt 21, write *Paſſive*, (underſtood for general Reference.)

## A SHORT GRAMMATICAL TABLE *of the ſeveral* TERMINATIONS *of all regular* LATIN VERBS, *active and paſſive, through the ſeveral* MOODS *and* TENSES *in the four* CONJUGATIONS.

### ACTIVE VOICE.

| | | *Singular.* | | | *Plural.* | | | |
|---|---|---|---|---|---|---|---|---|
| *Perſons.* | | I. *I.* | II. *Thou.* | III. *He.* | I. *We.* | II. *Ye.* | III. *They.* | *Conj.* |
| Ind. | 1. | o | as | at | ámus | átis | ant. | 1. |
| | | eo | es | et | émus | étis | ent. | 2. |
| | | o | is | it | imus | itis | unt. | 3. |
| | | io | is | it | ímus | ítis | iunt. | 4. |
| | 2. | bam | bas | bat | bámus | bátis | bant. | 1.2.3.4. |
| | 3. | i | íſti | it | imus | íſtis | êrunt,êre. | Ditto. |
| | 4. | eram | eras | erat | erámus | erátis | erant. | Ditto. |
| | 5. | bo | bis | bit | bimus | bitis | bunt. | 1.2. |
| | | am | es | et | émus | étis | ent. | 3.4. |
| Imp. | 6. | —— | a, áto | et, áto | émus | áte, atóte | ent, anto. | 1. |
| | | —— | e, éto | eat, éto | eámus | éte, etóte | eant, ento. | 2. |
| | | —— | e, ito | at, ito | ámus | ite, itóte | ant, unto. | 3. |
| | | —— | i, íto | iat, íto | iámus | íte, itóte | iant, iunto. | 4. |
| Pot. | 7. | em | es | et | émus | étis | ent. | 1. |
| | | am | as | at | ámus | átis | ant. | 2.3 4. |
| | 8. | rem | res | ret | rémus | rétis | rent. | 1.2.3 4. |
| | 9. | erim | eris | erit | érimus | éritis | erint. | 1.2.3.4. |
| | 10. | íſſem | íſſes | íſſet | iſſémus | iſſétis | íſſent. | 1.2.3.4. |
| | 11. | ero | eris | erit | érimus | éritis | erint. | 1.2.3.4. |

### PASSIVE VOICE.

| | | *Singular.* | | | *Plural.* | | | |
|---|---|---|---|---|---|---|---|---|
| | | I. *I.* | II. *Thou.* | III. *He.* | I. *We.* | II. *Ye.* | III. *They.* | *Conj.* |
| Ind. | 1. | or | áris vel áre | átur | ámur | ámini | ántur. | 1. |
| | | eor | éris vel ére | étur | émur | émini | éntur. | 2. |
| | | or | eris vel ere | itur | imur | ímini | úntur. | 3. |
| | | ior | íris vel íre | ítur | ímur | ímini | iúntur. | 4. |
| | 2. | bar | báris v. báre | bátur | bámur | bámini | bántur. | 1.2.3.4. |
| | 5. | bor | beris v. bere | bitur | bimur | bímini | búntur. | 1.2. |
| | | ar | éris vel ére | étur | émur | émini | énter. | 3.4. |
| Imp. | 6. | — | áre, átor | étur, átor | émur | ámin-i, or | éntur, ántor. | 1. |
| | | — | ére, étor | eátur, étor | eámur | émin-i, or | eántur, éntor. | 2. |
| | | — | ere, itor | átur, itor | ámur | ímin-i, or | ántur, úntur. | 3. |
| | | — | íre, ítor | iátur, ítor | iámur | ímin-i, or | iántur, iúntur. | 4. |
| Pot. | 7. | er | éris vel ére | étur | émur | émini | éntur. | 1. |
| | | ar | áris vel áre | átur | ámur | ámini | úntur. | 1.2.3. |
| | 8. | rer | réris v. rére | rétur | rémur | rémini | réntur. | 1.2.3.4. |

### ACTIVE VOICE.

1. I love, or do love.
2. I loved, or did love.
3. I have loved.
4. I had loved.
5. I ſhall or will love.
6. Love thou.
7. I may or can love.
8. I might (would, ſhould, or could) love.
9. I might (would, ſhould, or could) have loved.
10. I might (would, ſhould, or coul have had loved.
11. I ſhall have loved.
12. To love.
13. To have or have had loved.
14. To be about to love.

15. Of loving, in loving, to love.
16. To love.
17. To be loved.
18. Loving.
19. Loved.
20. About to love.
21. To be loved.

## PASSIVE VOICE.

1. I am loved.
2. I was loved.
3. I have been loved.
4. I had been loved.
5. I ſhall or will be loved.
6. Be thou loved.
7. I may or can be loved.
8. I might (would, ſhould, or could) be loved.
9. I may (might, would, ſhould) have loved.
10. I might (would, ſhould, or could) have had been loved.
11. I ſhall have been loved.
12. To be loved.
13. To have been loved.
14. To be about to be loved.

| | | | | | |
|---|---|---|---|---|---|
| *N B.* The four Verbs active, | *Am-o,* to love, | 1 | *Conjugat.* | are preferred, for *Patterns,* to | *Am-o,* to love, |
| | *Doc-eo,* to teach, | 2 | | | *Mon-eo,* to adviſe, |
| | *Leg-o,* to read, | 3 | | | *Reg-o,* to govern, |
| | *Aud-io,* to hear, | 4 | | | *Aud-io,* to hear : |

The former four being the *ſhorter* Sound, and denote the *plainer* and *perfecter Ideas.* — Though the Ending of the Supine, *-itum,* in *Mon-itum,* (from the firſt Ending. *eo,)* is *more* general than *tum,* in the Supine, *Doct-um.* And the *Preterperfect Tenſe, Rex-i,* (from the Ending, *go,* in the 3d Conjugation, 1ſt Perſon, Preſent Tenſe,) more *general* than *Leg-i,* from *Lego.* Exceptions to general Rules are too many to be *all enumerated* ; and, ſince all *Latin* Verbs muſt be declined, the ſhort and familiar *Exceptions* may be uſed for Patterns, according to *Lily*'s *Originals,* inſtead of *barder-ſounding* or *unuſual Regulars,* introduced by *Rival Grammarians* for ſelfiſh Ends.

### EXAMPLE I. ACTIVE VOICE.

*Required the firſt Perſon Plural, Imperative Mood, Active Voice, of* Amo, *to love, firſt Conjugation.*

Againſt the *referential Numbers,* Imperative Mood, active Voice, ſtands 6 ; look for 6, where *Amo* ſtands, under the firſt Conjugation, and you will find *Am-a* ; take the *Radical, Am-,* and join it to the Termination, *emus,* ſtanding againſt 6 in the *Termination-Page,* and it will make *Amemus,* let us love. *Anſwer.*

### EXAMPLE II. PASSIVE VOICE.

*Required the third Perſon ſingular, Indicative Mood, paſſive Voice, of* Delec-to, *to delight, firſt Conjugation.*

Againſt the *referential Numbers,* Indicative Mood, Future Tenſe, 1ſt Conjugation, paſſive Voice, ſtands 11, againſt the *Pattern* Verb, *Am-atus ero vel fuero,* whence *Am-atus erit vel fuerit* is the 3d Perſon ſingular, (by the *Auxiliary, ſum,* whoſe Declining will be ſhewn.) Whence, inſtead of the Radical, *Am-,* put *Delect-,* and it will be *Delectatus fuerit,* He ſhall have been delighted, or, He ſhall be delighted hereafter. *Anſwer.*

*** *For declining* irregular *and* defective *Verbs, and for a more general and perfect* Exemplification *of the Formation of* Latin *Verbs, from their* Radicals *and four* Pattern *Verbs, we refer to our* Short Latin Grammar *to be publiſhed hereafter.*

# PART II.

## ANSWERS *to all the* ÆNIGMAS *in laſt Year's* PALLADIUM.

I. The Letter D.
II. PIT-COAL.
III. SHOES.
IV. A PLANE.
V. An HOUR-GLASS.
VI. A KEY.
VII. MADAM.
VIII. A WARMING-PAN.
IX. The 9 FIGURES.
X. A POPE'S BULL.
XI. EVIL.
XII. BELLOWS.
XIII. STILTS.
*Prize.* A CRIBBAGE-BOARD.

### *All the* ÆNIGMAS *anſwered by* Ruralindus *to* Ruralinda.

O THOU! adorn'*D* with each attractive Grace, 1.
A virtuous Mind and Soul-enchanting Face!
Whoſe lovely Form ſurrounding Crowds admire,
Whoſe lively Wit does ev'ry Boſom fire!
O hear, for once, your ſupplicating Swain,
And deign, O deign, to mitigate my Pain! —
Were Crowns and Kingdoms mine to give away,
Or were the World all ſubject to my Sway,
All, — all, I could with wond'rous Joy reſign,
If, by theſe Means, I might but call you mine. —
Would Heav'n, all-gracious, but aſſign my Lot
To dwell with you beneath ſome humble Cot,
There I'd rejoice, if only bleſt with Health,
And pity all the grov'ling Sons of Wealth. —
With what Delight ſhould I behold the Spring!
How joy to hear the feather'd Warblers ſing!
Their rural Strains would more true Joys inſpire
Than all the Muſic of a Handel's Lyre;
For he, with all his moſt enliv'ning *Keys*, 6.
Could never like theſe nat'ral Songſters pleaſe.
The lowly *Plane*, and proud aſpiring Hill, 4.
The bubbling Fountain, and the purling Rill,
The painted Flow'rs, and gently-fanning Breeze,
And all Creation would more than uſual pleaſe. —
Then, Ruralinda, deign to let me love,
And, with a Smile, my Wretchedneſs remove;
For once let Pity, heav'nly Pity, reign,
And doom me not to ſpend my *Hours* in Pain. 5.
But oh! I fear 'tis vain for me to plead,
For, in your Looks, I no *Indulgence* read; 10.
Ne'er from thoſe Lips one tender Word obtain,
My Sighs and all my Eloquence in vain. —
In vain among my Friends I ſeek Relief;
Their kind Advice does but augment my Grief. 9.
To Books and *Figures* I've in vain apply'd,
My *Heat* for Learning ſeeming to ſubſide. 2. *Alluding to Coals.*
Sometimes I ſtrive to drown my Cares in Noiſe,
Where *Cribbage*, **Men**, and *Stilts* employ the Boys, *Prize.* 13.

Where *Madam*'s ſeen attended by her Maid, 7.
With ſpotleſs *Shoes* and gaudy Robes array'd; 3.
But there deep Sorrow hangs upon my Soul,
And Love ſtill reigns unmindful of Controul.
Beſide the Rill that gurgles down the Dale,
How oft do I my hapleſs Lot bewail!
Pour out in Sighs the Anguiſh of my Mind,
And pray the heav'nly Pow'rs to make you kind!
The bleating Flocks have often heard my Groans,
And when I weep ſoft Philomela moans.
The Blackbird with his ſweet melodious Tune,
And Linnets warbling in the Shades of Noon,
The Flow'rs enrich'd with various lovely Dies,
From whence a Thouſand grateful Scents ariſe,
Can ne'er, alas! now diſſipate the Gloom,
Or make me mindleſs of my *Evil* Doom. 11.
Without Refreſhment all the Breezes *blow*, 12.
And Echo ſighs, reſponſive, to my Woe. —
Oh! condeſcend your faithful Swain to ſave;
Oh! ſnatch me from the Borders of the Grave;
Oh! let me claſp thee in my longing Arms,
Pour out my Soul, and feed upon thy Charms;
Oh! let me preſs thy lovely Lips to mine,
And loſe my Grief in Raptures half divine!

*All the* ÆNIGMAS *anſwered by the Rev.* Thomas Vaughan, M. A. *at* Morpeth.

*COAL*, *Shoes*, a *Plane*, an *Hour-Glaſs*, Letter *D*,
With *Madam*, *Figures*, *Pope's Bull*, and a *Key*,
*Stilts*, *Bellows*, *Cribbage-Board*, with *Evil*, live;
Anſwers to all th'Ænigmas truly give.

*All the* ÆNIGMAS *anſwered, in* Latin, *by Mr.* Alexander Rowe.

*QUARTA Litera, mea Domina, Pluſcula, Dolabra,* 1. 7. 3. 4.
*Carbones minerales, Clavis, Thermoclinium, Malum, Follis,* et *Clepſydra.*
[2. 6. 8. 11. 12. 5.

*To the* PALLADIUM-AUTHOR. *By the Rev.* Thomas Vaughan, M. A.
*On his receiving the Lot of* 4 Palladiums, *covered with gilt emboſſed Paper.*

FROM *Paris*' Hand when *Venus* did receive
The famous *golden Apple*, I believe
Her real Joy not more, on that Decree,
Than from *your Prize* there was deriv'd to me!
May the PALLADIUM always bear the Bell,
And for its Uſe in Science ſtill excel!
Then your *Contributors* will Laurels wear,
And *Io Pæans* ſing with Joy each Year!

*Anſwer to the* PRIZE-ÆNIGMA, *by Mr.* Iſaac Gumley.

I.

YE young and vain, from Mirth refrain,
And take a Friend's Advice;
Forbear to play your Time away
With *Cribbage-Boards* or Dice.

II.
Forbear to think that Noiſe and Drink
Can drive your Cares away;
Or gaudy Dreſs remove Diſtreſs,
And ſkreen you from Decay.

III.
Let Wiſdom's Page your Thoughts engage,
Where num'rous Beauties ſhine,
To fill the Mind with Joys refin'd,
And Raptures all divine!

### *The ſame anſwered by Mr.* George Lacey, *of* Bridport.

WITH eager Eyes the Laurel-Prize
I read, but all in vain;
More calm I grew; when to my View
The *Cribbage-Board* was plain.

### *Anſwer to the* PRIZE-ÆNIGMA *by* Philo-Sophia.

EPHRAIM with Sophy once at *Cribbage* play'd:
You cheat, my Dear, to him ſhe ſmiling ſaid.
Cheat Thee! ſays Ephraim — ſay not ſuch a Word —
I'd rather cheated be — and burn the *Board!*

### *Anſwer to the* PRIZE-ÆNIGMA, *by Mr.* W. Penn, *of* Chalfont, Bucks.

OLD Argus with a Hundred Eyes look'd after Io;
But I, with more *twenty-one*,* guard chaſte Sophia.

* *Cribbage-Board* Eyes, Number 121.

### *All the* ÆNIGMAS *anſwered by* Gemini, *of* Morpeth.

### *Addreſſed to Miſs* Polly Stow, *on Occaſion of an extraordinary printed Libel, on the* Palladium *and its Correſpondents, being ſent to that young Lady and all the* Palladium *Coreſpondents, ſigned* BLOODY BUTCHER,

*Dear Miſs,*
THE Fable of the Toad† you've read,
Where, in a *Glaſs*, you've ſeen diſplay'd, 5.
How one, with Envy ſwoln and curſt,
Aping the Ox, ſwell'd till he burſt!
So envious Scribblers, taking Pains,
Swell till they've burſt their little Brains!
Who on Palladiums will comment,
While Ignorance defeats th'Intent.
To School-boy Queſtions there, conceive,
What Anſwers can this Maſter give?
The Envy rais'd, wiſe Men deteſt,
Has brought you into more Requeſt.
The Palladium-Author, Work, and Friends,
The brighter ſhine by Friction's Means;
Soot rubb'd o'er Plate ſtill makes it whiter,
And conſequently much the brighter.
Of Buttons, Miſs, be not afraid,
Nor yet of Hats to deck the Head:
Honours were not for Ruffians made.
If one's in proper Habit dreſt,
The Claſps and Strings become him beſt;

† *and Ox.*

His Frock with Knife and Steel be hung,
Great Maſter of the vulgar Tongue!
Obſcenity he takes for Senſe,
As Modeſty is his Offence:
So, Miſs, reſign him to his Maker,
Pſhaw, Sophy, or the modeſt Quaker!
Ne'er to his Works attempt a *Key*, 6.
As he ſcarce knows a, b, c, *D*; 1.
His *Evil* Deeds are black as *Coal*, 11. 2.
The *Pope* can't pardon Half his Soul; 10.
His Efforts, *Madam*, pray diſdain, 7.
Who, like bad *Bellows*, puffs in vain! 12.
His Conſcience, like a *Cribbage-Board*, *Prize*.
'Tis *plain* has oftentimes been bor'd. 4.
His Rhimes, on *Stilts*, but hobbling go, 13.
His Senſe not worth a caſt-off *Shoe*, 3.
*Figures* nor Letters does he know. 9.
But now, dear Miſs, I've ſaid enough
About ſuch choice and precious Stuff!
To Worth like your's and H--h's I'll be
A Friend to all Poſterity.
I'm, with Regard, your's — GEMINI.

*Mr.* Thomas Stuckfield, *Schoolmaſter, in* Whitehorſe-Street, Stepney, *(near* London,) *anſwers the 3d and 11th* ÆNIGMAS, *as follow.*

*Anſwer to the 3d. On Matrimony.*

HOW happy the Days when in Wedlock we're join'd,
Where Love, Truth, and Honour, in both are combin'd;
With Raptures each Moment their Boſoms will glow,
Whoſe Smiles ſweet Contentment alone can beſtow;
While ſhe with her Needle her Art does diſplay,
He chearfully follows the Work of the Day.
Old Time ſtill attends them on gay ſilken Wing,
And pleaſing Reflections ſtill new Raptures bring.
How bleſt the fond Pair who theſe Maxims purſue,
And Care ſits as eaſy as any old *Shoe*.

*On the 11th.*

WHO'D wiſh to *live*, nor *live* in vain,
From *Evil* Actions muſt refrain.

Mr. *Joſeph Hunt*, Maſter of *Winſlow* School, anſwered all the *Ænigmas* in elegant Verſes to *Lucinda*, but our *Room cannot contain all the Merit we receive*. Meſſrs *John Wadſorth* and *Wilſon*, Pupils to Mr. *James Lamb*, of *Aldbury*, anſwered 1, 3, 4, 5, 6, 7, 11, 12, 13, and the *Prize Ænigmas*. Mr. *Richard Dalton*, 1, 3, 4, 5, 6, 7, 9, 11, 12, and *Prize*. Mr. *Richard Drake*, 1, 3, 4, 5, 6, 7, 9, 11, 12, 13. Mr. *William Wells*, all but 2 and 8; Mr. *Stephen Hartley*, all but 2 and 8; Mr. *George Lacey*, all but 2 and 8; a *Northumbrian*, all but 1, 2, 8; Mr. *W. Hurne*, of *Watton*, anſwered the *Prize* in Verſe, all in Proſe but 2, 8, 11, 13. Mr *Thomas Jones*, of *Counteſthorpe*, anſwered all in elegant Verſe; as did Mr. *W. Jon*; Mr. *George Perrot*, all but 2, 8, 9, 10; Mr. *Scot*, all but 8, 12; Mr. *W. Hayes*, all but 2, 9, 10, 12, 13, and *Prize*; Mr. *W. Marſden*, all but 2, 8, 12; Mr. *James Hartley*, all but 2, 8, 10. Mr. *James Muſcroft*, 3, 4, 5, 6, 7, 11; Mr. *W. Penn*, 1, 3, 4, 5, 6, 11, 12, 13; Mr. *Robert Arnold*, junior, of *Brinſworth*, 3, 4, 5, 7, 8, 11. Mr. *Potts*, all but 8; Mr. *Ward*, Collector, all but 2, 8, 12, 13, and *Prize*.

⁂ We cannot admit of Room for Ænigmas on remote Subjects ſent us, (like Ænigmas made on Subjects in the Moon, or on the *Satellites* of *Jupiter* and *Saturn,)* nor for mean Subjects, or Things incorrectly performed, nor for Others coming too late, not being duly correct and conſidered. If theſe Correſpondents expect to ſhine in their Talents, they ſhould be leſs in a Hurry when they write, and employ that Time and Attention, in the Service of the *Palladium,* they before employ for other periodical Productions. To tell us of their *Hurry,* or *great Buſineſs,* is ſo far from being a ſufficient Apology for Neglect, that it is an *Aggravation* of their Failures and Omiſſions.—Nothing but Things properly conſidered and finiſhed are admitted into the *Palladium.*

## ANSWERS *to the* QUERES *in laſt Year's* PALLADIUM.

### I. Quere 226, *anſwered by Mr.* Iſaac Gumley; *of* Counteſthorpe.

WHEN *Adam* firſt beheld his *Partner* Eve,
Bleſt with more Charms than we can well conceive,
A Warmth unuſual glow'd within his Breaſt,
He kiss'd his Bride, and own'd that he was bleſt.

12

Mr. *Richard Drake,* of the *Iſle of Wight,* anſwered it in the ſame Manner.—Mr. *John Milton,* of *Newport* in the *Iſle of Wight,* gave us *Milton*'s elegant Verſes in *Paradiſe loſt,* B. iv. L. 492. ending thus, *And preſs'd her Matron Lip with Kiſſes pure.* Mr. *Stuckfield* anſwered it in two elegant Couplets to the ſame End.

*Mr.* Alexander Rowe *anſwers thus.*

WHEN plac'd in *Eden,* the firſt happy Pair
Firſt taſted of the heav'nly *Banquet* there!

### II. Quere 227, *anſwered by Mr.* Richard Drake.

I think from *Scripture* it does not
Appear who was the Wife of *Lot.*

Miſs *M—y,* of *Newport,* at Mr. *Nicholſon*'s School in the *Iſle of Wight,* anſwered it in the ſame Manner.

### III. Quere 228, *anſwered by the Propoſer,* Gemini, *of* Morpeth.

A Country Woman begg'd a Boon
Of a rich Merchant, here well known;
Who, generous Heart! quite free to all,
Of *Packthread* handed down a Ball,
That meaſur'd twelve-ſcore Yards — to grant —
And bid her take what ſhe might want.
She talk'd, — roll'd off, — to tire your Patience, —
At laſt ſaid, 'Here's enough in *Conſcience.*'
The Merchant ſmil'd, — and ſaid, 'Let's ſee
'What may a *Woman's Conſcience* be!'
He found it *forty Yards* in all;
If he'd had none, ſhe'd taken the Ball!

*Mr.* Richard Drake *ſays,*

THE Diff'rence is Nothing between what we call
A *Conſcience* that's *large,* and *no Conſcience* at all.

Miſs *W—n,* of *Newport,* anſwered it in the ſame Manner; as did Mr. *Hartley.* Mr. *John Hart,* (or his Pupils,) of *Cambo,* makes *Conſcience* an enthuſiaſtical Impulſe, as it is generally uſed or underſtood, without being juſtified by Senſe or Reaſon: *That Conſcience will rob a Church to build an Hoſpital.* It often baniſhes Morality, and admits not Nature, Liberty, or Property, unleſs

Verſe and Chapter can be ſhewn for it; making no *Difficulty* in doing the worſt of Things, under the *Sanction* of *Conſcience,* while it ſcruples doing the moſt *neceſſary* Offices of a Chriſtian; being no Conſcience at all. Conſequently the *large Conſcience* muſt be, in the Application, only in Oppoſition to *no Conſcience*.

### IV. Quere 229, *anſwered by Mr.* Richard Drake, *of the* Iſle of Wight.

ACCORDING to the celebrated Dr. *Halley*, the Parts of the Earth required lie under the Poles, and when the Sun is in the *two Tropics,* and the Sun in the Zenith. *See the* Philoſophical Tranſactions, *Number* 203, *P.* 878.

*Miſs* W—n, *of* Newport, *in the* Iſle of Wight, *ſays,*

THAT the Parts of the Earth are the *Poles*, does appear;
When the Sun's in the Tropics, the *Times* of the Year.

Referring to the *Philoſophical Tranſactions, exactly* as above.

Mr. *Alexander Rowe* anſwers, that when the Sun is in *Cancer* the *Heat* will be the *greateſt* to all the Inhabitants in every Part of the Northern, and *leaſt* to thoſe in every Part of the Southern, Hemiſphere; and when the Sun is in *Capricorn* the contrary will happen. — But, the Sun always moving in the *Ecliptic*, and the Earth revolving on its Poles towards the Sun, the Places at the Poles, being the moſt remote, will be generally the *coldeſt*; as thoſe at the Equator, being neareſt the Sun, will be generally the *hotteſt*.

*N. B.* All Places, parallel to the *Ecliptic,* did the Earth turn on thoſe *Poles*, would be continually hotteſt and coldeſt, or have the ſame Heat, and there would be no *Diverſity* of Seaſons. Palladium-Author.

### V. Quere 230, *anſwered by Mr.* Drake.

BY the *Laws* of *Hydroſtatics*, a leſs Weight than *itſelf* will raiſe it up; but, in a ſtagnant or confined *Fluid*, or one that has a great Degree of *Tenacity*, or if the Body be in cloſe *Contact* with the Bottom of the containing Veſſel, *&c.* it may require more Weight than itſelf to raiſe it up.

Mr. *Hartley* obſerves as above, *at firſt*; but ſays it will require a *greater* Weight than itſelf to force it out; becauſe Part of the *Fluid* will adhere to it. That, in the *Fluid*, its Weight will be as the *different* Denſity of it and the Fluid.

Mr. *Alexander Rowe* ſays, to a *Force*, equal to the Weight of the Body, another *Force* muſt be added equal to the Weight of the Column of Fluid, (whoſe Baſe is equal to the upper Surface of the *immerſed Body*, and Height equal to the *Diſtance* from the ſaid Surface to the Superficies of the Fluid,) until the Fluid *inſinuates* itſelf under the Body, and acts equally on all its Parts, (or till it is raiſed a Space equal to its Thickneſs,) and then a *Power* equal to its Weight will bring it up.

### VI. Quere 231, *anſwered by Mr.* Drake.

IN King *Charles* the Second's Time, when Sir *Robert Holmes*, of the *Iſle of Wight*, brought Gold-Duſt from the Coaſt of *Guinea*, a *Guinea* firſt received its Name from that Country.

### VII. Quere 232, *anſwered by the* Palladium-Author.

TO pray for *Rain* in Churches, or elſewhere, appears to be the ſame as to pray for *Snow, dry Weather*, or *Sunſhine*, and for ſuch *Things* as different Peoples Fancies or wrong Judgements, or different Views and vain Imaginations, ſuggeſt to them. For, the Operations of *Nature* are ſuppoſed to be *univerſally* carried on every where for the Good of the *Whole*; and if it be true, what Mr. *Pope* ſays, in his *Ethic Epiſtle*, there can be no Error in Nature:

*In Spite of Pride, in erring Reaſon's Spite,*
*One Truth is clear, Whatever is is right:**

*Reſpecting Nature.

To which may be ſubjoined,

*Except Man's* Will, *exempt from Nature's Laws,*
*In Spite of* Doubt, *our Good or Evil draws.*

Perſons of the ſame or different *Occupations* and *Intereſts* pray for different elementary Weather at the *ſame* Time and Place. So different *Armies* pray to God for different *Succeſſes*, or Deſtructions. And how is it conſiſtent for God to oblige both *Parties?*

If *God's Will be done on Earth as it is in Heaven*, (prayed for, in the Lord's Prayer, in Churches,) there is *little Occaſion* for other Solicitations of the divine *Power* and *Goodneſs*, ſince aſking what may be unfit for us will prove a *Hurt* inſtead of *Benefit*; as the Farmer, in the Fable, reſigned the Weather into *Jupiter*'s Hands again, when he had enjoyed what Weather he aſked for, and found his Crops worſe than his Neighbours.

*One Part of the Scripture teaches to bleſs them that curſe you, and pray for them that deſpitefully uſe you, Libellers, &c.* againſt the Church Doctrines of *curſing our Fellow Beings!* But though the Texts of *Scripture* ſeem to *claſh* with each other in different Places, as the *Statute Laws* in different Acts of Parliament differ ſo much as ſometimes to require an *Adjuſtment*, (like a *Hadley*'s Quadrant,) yet the divine and human Commands, in general, are *reconciled* by a *general* Obedience to *Morality and Religion*, and an Abſtinence from *Vice and Injuſtice*.

The *Irregularities* of Man's Race require to be put under *Laws* and *Government*, as is evident from their various and irregular Propenſities and Inclinations; yet the *Deviation* of whoſe Wills from Equity and Juſtice, with Reſpect to their Conduct towards one another, is ſuch, that ſometimes no Force or Puniſhment, but *cutting them off*, is able to reſtrain their Irregularities and keep them in Order.

The infinitely *wiſe Being*, permitting Men's Irregularities, (for *Experiment* or *Probation*,) to anſwer the Ends of his *glorious Creation*, he can diſpoſe of them here, or remove them from this to another *State* of Being, as he ſees beſt fit. And ſince all *created Beings* are within the *Graſp* of the *divine Power*, to do with them the *Way* moſt ſuitable to his Pleaſure, therefore to ſubmit *(by reſigning to His Providence)* is the right human Wiſdom.

Yet the Race of Mankind (corrupted as it is) is certainly at *Liberty* to aſk of GOD to grant what is *fit and good for their Happineſs*; and, while they *aſk*, to beg that he would avert or refuſe *what is againſt their Happineſs*, or *hurtful to them*, though aſked.

### VIII. QUERE 233, *anſwered by* Honeſtus.

TO the *firſt* Part of this *Quere* the Anſwer is *yes*. The *ſecond* or *latter* Part refers to the *worthy and reverend Conductor-General* of the *Longitude*, at his *Dormitory*, at *Greenwich-Obſervatory*; to whom all the *Palladium Correſpondents*, obliged by printed Encomiums from that *Quarter*, are hereby authorized *reſpectfully*, *rightfully*, and *righteouſly*, to apply for a direct and proper *Anſwer*.

### PRIZE-QUERE *anſwered by* Inveſtigator.

WHOEVER would wed, ſhould both *Parties* agree,
For the Good of themſelves, and their own *Progeny*:
A *Diſſention* in either has often been found
Productive of *Cuckows* o'er all the World round.
The *Huſband* offended will make his *Exchange*,
The *Wife* diſoblig'd too will ſeek her *Revenge*:
Whence we find in a Nation but Families few
(By ill-matching of *Pairs*) where the *Breed* is quite *true*.*

* *Where all the Sons are valiant, and all the Daughters virtuous.*

To marry by *Chance* what Hazards Men run,
Foredoom'd to be *Cuckows* from Father to Son.
While the *nat'ral-born*, who diſtinguiſh the *Breed*,
For a Proof of their *Lineage* have far the leſs Need.
The *Virgin*, or *Widow*, who ſells her *Freehold*,
For Love or Eſteem, or for Liking or Gold,
Has *Iſſue* more certain, more clear, than the Wiſe,
Where ſhe and the Huſband are often at Strife.
  By *Fluxions* and *Algebra*, *Logarithms* too,
The *falſe* and *true born** are as *ſix* is to *two* ;
And the *Cuckow-born* Birds to the *nat'ral* by Birth
Are as *one* is to *ten* throughout the whole Earth ;
Inverting the *Daſtards* to Men of *true Worth*.
  In *Spain* is the *Padlock* to lock up the Prize ; †
In *Turkey*, the *Keeper* ‡ to keep off Surprize !
In *China*, ſtrait *Shoes* ‖ to make Women go right ;
And the *Veil*, in ſome Places § keeps Others from Sight.
To keep Wives within *Bounds*, in more lewd *Italy*,
One *Gallant* is allow'd, who is call'd *Ciciſbe*. ¶
In *England*** the *Ladies* all live more at Eaſe,
Where *Married* and *Single* do juſt as they pleaſe.
The Married and Single, above Mens Controul,
To *Maſquerades* go, or with *Gallants* may ſtroll.
So *Sophy*, admir'd, with her *Hat and fine Feather*,
Rides out, without *Deary*, quite ſafe with *Another*,
In fine *Silver Habit*, in very fine Weather !

* *In Marriage.* † *Virtue.* ‡ *An Eunuch.*

‖ *Made of Iron, to cripple the Feet of female Children ; an Expedient uſed ſince the* Chineſe *Women raiſed a Rebellion to take the Government into their own Hands ; who failed, though they had nearly carried their Plot.*

§ *In* Spain, Turkey, &c.

¶ *This is ſtipulated in the Marriage Articles, to prevent farther Amours. When the* Ciciſbeo *comes the Huſband muſt retire.*

** *Here,*
*Men put a Padlock on the Mind,*
*Who are to Women very kind,*
*And to their* Failings *are quite blind!*
Calaſhes *pretty Faces hide,*
*To avoid the* Sin *of being ſpy'd,*
*And keep the* Skin *as white as Snow,*
*That* Roſes *there may never grow ;*
*With Head-dreſs high, that may affright !*
*That Men may never come in Sight ;*
*On high Heels prop'd — like* Ghoſts *upright !*

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## ANSWERS *to the* REBUSES *in laſt Year's* PALLADIUM.

I. BRIDGEWATER.
II. MOOR.
III. HATCH.
IV. WATCHET.
V. THORN.
VI. COBHAM.
VII. A CUCKOLD.
VIII. HATFIELD.
IX. ELGIN.
X. A SWAN.
XI. A GNAT.
XII. HUTTON.

*A general Anſwer to the* REBUSES *by Mr.* Iſaac Gumley, *of* Counteſthorp.

LOVELY Spring again is ſeen,
With her ſweet enchanting Mien ;

Flowers ariſe to deck the Ground,
And to ſpread their Sweets around.
Hark ! the Linnet from the *Thorn* 5.
Gladly does ſalute the Morn.
*Cuckows*,* that were ſilent long,
Entertain us with a Song ;
*Swans* along the River ſail, 10.
*Gnats* are driven by the Gale. 11.
Now the Nymphs and jolly Swains
Saunter o'er the flow'ry Plains;
*Moor* and *Hatfield*, with their Charms, 2. 8.
Draw the Swains around in Swarms ;
*Hutton* too Admirers gains, 12.
And ſhe fills their Hearts with Pains,
Damon for young Phillis ſighs,
Who his fond Requeſt denies ;
Yes, young Damon now does prove
All the killing Pangs of Love.
Lovely Phillis, why ſo coy ?
Smile, and give our Damon Joy.
To your faithful Swain be kind,
Such another you'll ne'er find,
Should you ſearch *Bridgewater* through, 1.
*Watchet*, *Hatch*, and *Cobham*, too. 4. 3. 6.
Come, my Delia, come away
To the Fields and Meadows gay ;
Hand in Hand come let us move,
Fill'd with Joy, and fill'd with Love.
Let the Miſer hug his Pelf,
Cheat the World, and ſtarve himſelf ;
Yet he does his Fate lament,
Never taſting true Content.
What is all the Pomp of Kings ?
Ev'ry Day it Trouble brings ;
While we taſte of Joys ſublime,
Joys as laſting as our Time.

### VII. REBUS *anſwered by Mr.* W. Jon.

IF the *Longitude-Spright* a *Cuckow* muſt be,
The feminine Bird is as modeſt as he.

### X. and XI. REBUS *anſwered by Mr.* Stuckfield, *of* Stepney,

### ACROSTIC.

M–ay ev'ry Charm await the Fair ;
I–n all the Joys of Life a Share ;
S–o that ſhe may the *Swan* outdo, 10.
S–ofter, milder, beautifuller, too!
H–ymen, with all his tender Train,
I–nſtruct her Heart, nor give her Pain!
L–et her, unlike the *Gnats* that teize, 11.
L–earn the beſt Art, — the Art to pleaſe.

### *All the* REBUSES *anſwered by the Rev.* Thomas Vaughan, M. A.

*Cambridge*, *Moor*, *Cobham*, *Watchet*, and *Hatch*, there's no Doubt,
To the five firſt Rebuſes Anſwers make out ;

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*Alluding to a Creature whoſe Maker is Woman.

A *Cuckold* and *Hatfield, Hutton, Elgin,* and *Gnat,*
The other five Rebuſes tell very pat.
A *Swan,* and a *Thorn,* two more plainly tell.
If theſe are the Anſwers — I've done very well.

Mr. *John Wilſon,* of *Aldborough,* anſwered all but the 12th *Rebus*; Mr. *Richard Dalton,* all but 1, 2, 3, 9, 10; Mr. *James Potts,* all but 1, 12; Meſſrs *Wadſorth* and *Wilſon,* all but 2, 9, 12; Mr. *William Wells,* all but the 3; Mr. *Hartley,* all but 1, 9, 11, 12; Mr. *G. Lacey,* all but 6 and 12; Mr. *Richard Drake,* all but 4, 10, 12; a *Northumbrian,* all but 11, 12; Mr. *W. Hurn,* of *Watton,* all but 2 and 12. Mr. *Stuckfield* anſwered the 2 and 3.

*Mr.* G. Lacey, *of* Bridport, *takes Notice of his being upbraided for his* Rebus *on* Dartmouth, *as if he had taken it wholly from Others made before; whereas the ſame Subjects in the* Lady's Diary *have been often repeated for Ænigmas — and Queſtions are liable to the ſame Sentiments: But if the ſame Things are propoſed in a different Manner and Dreſs, there may be ſtill Improvement in* Diction *and* Sentiment, *and therefore not blameable.*

Mr. *G. Perrot* anſwered 1, 2, 5, 6, 7, 8, 10; Mr. *W. Marſden,* all but 1, 3, 7, 9; Mr. *Joſeph Hartley,* all but 3, 9; Mr. *Joſeph Sherwin,* 7, 8, 10; Mr. *James Muſcroft,* 5, 7, 8, 12; Mr. *W. Penn,* 6, 7, 8, 10; Mr. *Alexander Rowe* moſt of the *Rebuſes*; Mr. *Rob. Arnold,* junior, of *Brinſworth,* 5, 7, 8, 12.

*N. B.* We ſhould be glad to know an ingenious Correſpondent's Reaſon (at *Pool, Carmarthen)* for ſaying, "*The very uſeful* Practical Arithmetician *ſurpriſingly circulates through this Neighbourhood,* [though never yet publiſhed,] *of which none are ſo glad as myſelf, nor none ſo willing to encourage real Science.*"

☞ It will begin to circulate at the Publication of this *Palladium.*

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## ANSWERS *to the* PARADOXES *in laſt Year's* PALLADIUM.

### I. PARADOX *anſwered by the Propoſer, Mr.* W. Wilſon, *of* Norwich.

THIS Correſpondent finds the Weight of a *Cone,* on *its Baſe,* and when *inverted,* by the *Arithmetic* of *Fluxions,* (putting $r$ for the Earth's Radius, $a =$ the Cone's Altitude, $b =$ Diam. Baſe, and $x =$ Part of the Axis, the flowing Quantity,) he comes to theſe Concluſions, (after making the flowing Quantity and other Quantities vaniſh:) As $\frac{3r^2 - 2ra - a^2}{r+a} - 3r - 3a + \frac{a^2}{r} - \frac{1}{2r+2a} \times$ Hyp. Log. $\frac{r+a}{r}$ (the Weight on the Baſe) : $\frac{3r^2}{r+a} - 3r + a - 2r \times$ Hyp. Log. $\frac{r+a}{r}$ (Weight inverted) :: 100 : 99 Tons, *(per Queſt.)* Multiplying *Extremes* and *Means,* an Equation is had, from whence $a$, the *Cone's* Height, in Reſpect of the Earth's *Radius,* may be found by *Trial and Error.*— But this Anſwer is rather more *ſpeculative* than practical.

Mr. *Hartley* anſwered it thus. Put $a$ and $b =$ 100 and 99 Tons, $r =$ the Earth's Radius in Miles, and $x =$ the Earth's Radius with the Cone's Height in Miles. Then, ſince any Body, placed above the Earth's Surface, is in the reciprocal duplicate *Ratio* of the ſaid Diſtance, we have, $x^2 : r^2 :: a : b$. Extremes and Means reduced, $x = \frac{\sqrt{ar^2}}{b}$.

Mr. *Alexander Rowe*'s *Anſwer.* — The Earth's Attraction and Air's Preſſure on the Cone (when in *Contact* with its Surface) make the Weight greater by a *Ton,* or more, when the Cone ſtands on its Baſe than on its Vertex.

### II. Paradox *anſwered by Mr.* Richard Dalton, *of* Pool, Carmarthen.

*HANNAH.*

Mr. *James Potts* alſo anſwered it; as did Mr. *John Wilſon*; Mr. *Joſeph Hunt*, who ſays, when two Letters are taken from the Word, it yet will retain the ſame Sound. Miſs *Hannah M—y*, of *Newport*, anſwered it; but obſerves, it will admit of only altering to *Hanah*, (cutting off one Letter, *n*,) but not to *Anna*, (cutting off two Letters,) for *Hana* will only read forward, when *n* and *h* are cut off. Mr. *W. Wells* anſwered it; as did Mr. *Hartley*, Mr. *Richard Drake*, Mr. *W. Hurn* of *Watton*, Mr. *St. Hill* of *Walworth*, Mr. *Richard Dalton*, Mr. *W. Hayes*, Mr. *James Hartley*, Mr. *James Muſcroft*, and Mr. *Penn*.

### III. Paradox *anſwered by Mr.* R. C. *the Propoſer.*

IN the Latitude of the Middle of the *Iſle of Wight*, the Diſtance round the Earth, meaſuring directly *Eaſt* or *Weſt*, is about 15970 Miles; and, as the Earth runs round in $23^h\ 56^m$, the *Iſle of Wight* rides from *Eaſt* to *Weſt*, at the Rate of 660 Miles an Hour, *continually*. And, if a Man rides on Horſeback, or in any Carriage, 10 Miles an Hour due *Eaſt*, he will ride in all 670 Miles an Hour.

Mr. *W. Wells* obſerves that there are many *ſuch Riders* in the ſame Latitude.

Mr. *Richard Drake* anſwered it ſomething like the *Propoſer*'s Anſwer.

Mr. *Joſeph Hartley* obſerves that the *Inhabitants* of the *Iſle of Wight*, by the diurnal Motion of the Earth, travel at the above *Rate*, or faſter.

Mr. *W. Penn* obſerves that

Mr. *R. C.* in the *Iſle of Wight*,
Rode 670 Miles* an Hour by Day and Night.

**If the Earth moves* 1000 *an Hour at the Equator.*

Mr. *Alexander Rowe* obſerves, that the Rider's *Pegaſus* was the Earth, that carried him at that *Rate* by its Rotation.

### IV. Paradox *anſwered by Mr.* W. Jon.

MARK the Middle of the 4 Sides of the *Square* (or *Parallelogram*) with Points, and draw Lines from one Point to another, to form an *inſcribed* Square (or Parallelogram); and the *inſcribed* Square (or Parallelogram) will be *exactly* of the ſame *Height* and *Width* (from Corner to Corner) with the firſt Square (or Parallelogram), meaſuring each Side and End; and the Area of the inſcribed Square (or Parallelogram) will be *exactly* Half the Area of the *greater*; as may be *geometrically* proved by Conſtruction.

Mr. *St. Hill*, of *Walworth*, anſwered it in the ſame Manner, as did Mr. *Alexander Rowe.* — Mr. *George W—e*, of *Newport*, anſwered it by ſtopping up *Half* the Window's Space at the Middle, but does not ſay how; as did Mr. *Drake*. Mr. *W. Wells* anſwered it.

Mr. *William Pen*, of *Chalfont*, obſerves,

From one *ſquare* Window's Space another frame;
Cut the four *Corners** off—the Height and Breadth's the ſame.

**To the Middle of each Side.*

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## ANSWERS *to the* QUESTIONS *in laſt Year's* PALLADIUM.

### I. Question 471, *anſwered by the* Palladium-Author, *jun.*

THIS is one of that Sort of Queſtions, called *unlimited*, and therefore admits of more than *one* Anſwer. The *Prize-Money*, 275*l.* 3*s.* 6*d.*$\frac{3}{4}$ = 264171 *Farthings* = 509 *Seamen* × 519 *Farthings each* = 519 *Seamen* × 509 *F. each* = 3 *Seamen* × 88057 *F. each* = 88057 *Seamen* × 3 *F. each* = 173 *Seamen* × 1527 *F. each* = 1527 *Seamen* × 173 *F. each*; being 6 Anſwers. W.W.R.

*N. B.* This Queſtion can be only anſwered by *Trial*, or Diviſion of the given Number, 264171 Farthings, by all the *prime*, and then *compound*, Numbers: *Literal Arithmetic* affording no Advantage in finding a Solution.

Mr. *Richard Dalton*, of *Pool, Carmarthen* ; Mr. *Wm Penn*, of *Chalfont St. Peter's, Bucks* ; Mr. *Wm Hayes*, of *Frodſham, Cheſhire* ; were the only Correſpondents who ſent us the complete Anſwers to the above Queſtion. But Mr. *W. Shaw*, of *Newchapel, Staffordſhire*, gave a ſingle Anſwer to the ſame ; as did *Cleonicus*, of *Kendal* ; Mr. *Fininly*, Maſter of a *School*, at *Thorney*, near *Peterborough* ; his Pupils, Mr. *Thomas Tee* and Mr. *George Siſſon* ; Mr. *Stephen Hartley*, of *Sowerby-Bridge* ; Mr. *John Fatherley*, of *Waſhington, Durham* ; Mr. *Alexander Rowe*, of *Reginnis, Cornwall* ; Mr. *James Potts*, of *Bedlington* ; Mr. *George Hicks*, of *Reedneſs* ; Mr. *John Sandys*, of *Thedleſton*, near *Derby* ; Mr. *Joſeph Hartley*, of *Lewes, Suſſex* ; Mr. *Thomas Robinſon*, of *Biddick* ; Mr. *Wm Hardy*, of *Cottingham-School*, near *Hull* ; Mr. *L. Harland*, of *Kingſton upon Hull* ; Mr. *James Muſcroft*, of *Rotherham* ; Mr. *Michael Taylor*, of *Marley-hill*, near *Gibſide* ; Mr. *John Harriſon*, of *Helſby, Cheſhire* ; Mr. *Wm Wells*, of *Crowle, Lincolnſhire* ; Mr. *Draper*, of *Surry* ; Mr. *George Perrot*, of *Heſſle* ; *J. N.* of *Stanton* ; and *Gemini*, of *Morpeth* ; but gave no more than a ſingle Anſwer each.

## II. QUESTION 472, *anſwered by the* Palladium-Author, *junior*.

### CASE I.

| Bags | Contain | Number | Value. | | |
|---|---|---|---|---|---|
| 1 | Guineas | 1097 | 1151*l.* | 17*s.* | 0*d.* |
| 2 | Half-Guineas | 907 | 476 | 3 | 6 |
| 3 | Quarter-Guineas | 743 | 195 | 0 | 9 |
| 4 | Half-Crowns | 701 | 87 | 12 | 6 |
| 5 | Shillings | 569 | 28 | 9 | 0 |
| 6 | Six-Pences | 401 | 10 | 0 | 6 |
| | Sum | 4418 | 1949 | 3 | 3 The *Eſtate* coſt. |

According to *Pieces* in each Bag, the *greater* Value of a Piece having the *greater* Number. } Alſo 1097 × 907 × 743 × 701 × 569 × 401 = 118,243 529,689.909,193, (18 Figures.) *One Way of Anſwer*.

### CASE II.

| Bags | Contain | Number | Value. | | |
|---|---|---|---|---|---|
| 1 | Guineas | 401 | 421*l.* | 1*s.* | 0*d.* |
| 2 | Half-Guineas | 569 | 298 | 14 | 6 |
| 3 | Quarter-Guineas | 701 | 184 | 0 | 3 |
| 4 | Half-Crowns | 743 | 92 | 17 | 6 |
| 5 | Shillings | 907 | 45 | 7 | 0 |
| 6 | Six-Pences | 1097 | 27 | 8 | 6 |
| | Sum | 4418 | 1069 | 8 | 9 The *Eſtate* coſt. |

According to *Pieces* in each Bag, the *greater* Value of a Piece having the leſs Number of *Pieces* in that Bag. } Otherwiſe. *This laſt Caſe is the true Anſwer.*

Mr. *Michael Taylor*, of *Marley-hill*, may now ſee the young Lady's Meaning, that ſhe was conſiſtent, who propoſed this Queſtion.

The ingenious Mr. *Hayes*, of *Frodſham*, anſwered this *Queſtion* as follows.

He ſuppoſes the Number of *Pieces* in each Bag (excluſive of the *Guineas*) to be equal ; as the continual Product of thoſe Numbers will then be the *greateſt*. He finds that the Number of Guineas muſt exceed 318. And then, by trying the *prime* Numbers (*i. e.* thoſe diviſible by 1 only) above 318, he finds the Number of *Guineas* to be 401. Whence, by proceeding in the ſame Manner for the other Numbers, he finds the Number of *Half-Guineas* = 569 ; *Quarter-Guineas* = 701 ; *Half-Crowns* = 743 ; *Shillings*, 907 ; *Six-pences*, 1097 ; which Numbers *exactly* anſwer the *Conditions* of the *Queſtion*. Whence he finds the Value of the *Eſtate* 1069*l.* 8*s.* 9*d.* as above. W. W. R.

Not one of our *Correſpondents*, beſides Mr. *Hayes*, has ſo much as attempted to anſwer the foregoing *Queſtion* ; but ſome Gentlemen (otherwiſe very capable) affirm it to be *defective*, and therefore avoid taking it in Hand.

III. QUESTION 473, *anſwered by Mr.* Richard Dalton, *of* Pool, Carmarthen.

GENERAL RULE. Let $a = 12$, and $b = 10$ ; then $\frac{ab}{a-1} =$ 10 h. 54 m. 32 Sec. 8-11ths = Time *required.*

Mr. *William Hedley*, of *Durham*, anſwers it thus. — As 11 to 12 ſo 10 to 10 h. 54 m. 32 s. 8-11ths ; ſerving for a *General Rule.*

Mr. *James Lamb*, Schoolmaſter, at *Aldbrough*, near *Hull*, anſwered it in the ſame conciſe and elegant Manner ; as did Mr. *Fatherley* ; Meſſrs *Wadforth* and *Wilſon*, Pupils to Mr. *Lamb* ; Mr. *Potts* ; Mr. *Sandys*, (as a *general Rule*, he bids to multiply the Number of Minutes, ſtanding againſt the *Hour*, by 12, and then to divide the *Product* by 11 for the Moment of *Conjunction* ; ) Mr. *James Egginton*, at *Burton upon Trent* ; Mr. *Marſden* ; Mr. *Joſeph Hartley* ; Mr. *Perrot* ; Mr. *Robinſon*, of *Biddick* ; Mr. *Wm Hardy*, of *Cottingham* ; Mr. *Harland* ; Mr. *Hayes* ; Mr. *Harriſon* ; Mr. *John Shadgett*, of *Roſs* ; Mr. *Gumley* ; Mr. *Muſcroft* ; Mr. *Pen* ; Mr. *Robert Arnold*, junior ; Mr. *Joſeph Sherwin*, junior, at *Allwaſton*, near *Derby* ; Mr. *Wm Wilſon*, of *Lincoln* ; Mr. *Draper*, of *Surry* ; Mr. *Stephen Hartley* ; Mr. *Fininley*, Maſter, and Mr. *Tee* and Mr. *Siſſon*, his Pupils, at *Thorney* ; Mr. *Ward*, Collector, at *Holdbreach-Bar* ; Mr *James Nicholſon*, of *Staunton* ; *Cleonicus*, at *Kendal* ; Mr. *William Shaw* ; Mr. *Wm Wells* ; Mr. *Alexander Rowe* ; Mr. *George-Hicks* ; Mr. *Sam. Hill*, of *Walworth*, *Surry* ; Mr. *Michael Taylor* ; Miſs *Sally Hill* ; and Mr. *Richard Drake*.

IV. QUESTION 474, *anſwered by Mr.* John Shadgett, *of* Roſs, Herefordſhire.

PUT $x =$ Time required. The Quantities voided by the ſeveral Cocks in that Time will be $\frac{x}{6}$, $\frac{x}{8}$, $\frac{x}{10}$, $\frac{x}{9}$, $\frac{x}{11}$, and $\frac{x}{13}$, reſpectively. Whence, (by the *Queſtion*,) $\overline{\frac{1}{6}+\frac{1}{8}+\frac{1}{10}-\frac{1}{9}-\frac{1}{11}-\frac{1}{13}} \times x = 1$. By Diviſion, $x = \frac{1}{\frac{1}{6}+\frac{1}{8}+\frac{1}{10}-\frac{1}{9}-\frac{1}{11}-\frac{1}{13}} = 8.87127$ Hours = 8 h. 52 m. 16 s. 34 th. &c.

Mr. *Wm Hayes*, of *Frodſham*, ſolved it by a *Method* ſimilar to that above, and in the ſame correct Numbers ; as did *Gemini*, of *Morpeth*, *Cheſhire*.

*Mr.* William Hardy, *of* Cottingham *School, ſolves it thus.*

$$\textit{Filling Cocks.}\left\{\begin{array}{l}\text{1ſt Cock fills } \frac{1}{6}\\ \text{2d ——— } \frac{1}{8}\\ \text{3d ——— } \frac{1}{10}\end{array}\right\}\text{ of the } \textit{Ciſtrn} \text{ in 1 Hour.}$$

Running all together, $\frac{1}{6}+\frac{1}{8}+\frac{1}{10}=\frac{47}{120}$ of the *Ciſtern* will fil in 1 Hour.

$$\textit{Emptying Cocks.}\left\{\begin{array}{l}\text{1ſt Cock empties } \frac{1}{9}\\ \text{2d ——— } \frac{1}{11}\\ \text{3d ——— } \frac{1}{13}\end{array}\right\}\text{ of the } \textit{Ciſtern} \text{ in 1 Hour.}$$

Running all together, $\frac{1}{9}, \frac{1}{11}, \frac{1}{13}, = \frac{359}{1287}$ of the *Ciſtern* will empty in $1^h$.

Hence, $\frac{47}{120}$ filled $-$ $\frac{359}{1287}$ emptied $=$ $\frac{17409}{154440}$ filled, in 1 Hour, all the *Fillers* and *Emptiers* running together.

Therefore, As $\frac{17409}{154440}$ Parts : 1 h. :: 1 Wh. : 8 h. 52 m. 16 s. $\frac{18}{583}$, the Time *required* to fill the *whole Ciſtern*, or *Reſervoir*, by all the *filling* and *emptying* Cocks running together.

Some of our *otherwiſe-capable* Correſpondents, by ſome *ſtrange Miſconception* of this *Queſtion*, or *Miſtake* in their Operations, found the Time, 1 h. 29 m. 28 s. $\frac{25608}{103569}$, inſtead of the *true* Time, as above.

Mr. *Wm Pen* gave 8 h. $\frac{5056}{5803}$ by a *proper* Deduction; firſt ſuppoſing the *Reſervoir* to hold 120 Gallons; when the firſt Cock will fill 20 G. the ſecond, 15 G. the third, 12 G. $= \frac{1}{6} + \frac{1}{8} + \frac{1}{10}$ in 1 Hour; the firſt Cock will empty $13\frac{1}{3}$ G. the ſecond, $10\frac{10}{11}$ G. the third, $9\frac{3}{13}$ G. $= 33\frac{203}{429}$ Gallons $= \frac{1}{9} + \frac{1}{11} + \frac{1}{13}$ in 1 Hour. Hence, $47\text{ G.} - 33\frac{203}{429}\text{ G.} = 13\frac{226}{429}$ G. : filled in 1 Hour :: 120 G. : $\frac{120}{13\frac{226}{429}} = \frac{51480}{5803}$ Hours = as before.

*Obſervation.* If 51480 be taken for the Gallons the *Reſervoir* contains, (the leaſt Number that 6, 8, 10, 9, 11, 13, will divide,) then the

1ſt Cock will *fill* 8580 G. 2d, 6435 G. 3d, 5148 G. = 20163 Gal. } in one
1ſt —— *empty* 5720 G. 2d, 4680 G. 3d, 3960 G. = 14360 Gal. } Hour.

All running together *fill* 5803 Gallons : in 1 Hour :: 51480 G. : $\frac{51480}{5803}$ Hour = as before. PALLADIUM-AUTHOR.

Mr. *Lamb* anſwered the ſame truly; as did Mr. *Wm Shaw*; Mr. *John Wilſon*, of *Aldbrough* School. Mr. *Draper* anſwered it; Mr. *James Potts*; Mr. *Wm Wells*; Mr. *George Perrot*; Mr. *J. S. Watchorn*; Mr. *Samuel Hill*, of *Walworth*; Mr. *Wm Wilſon*, of *Lincoln*; Mr. *Michael Taylor*; and alſo Miſs *Sally Hill*; anſwered it in the ſame Manner.

What is amazing, after ſome Correſpondents have miſſed the *true Time*, in giving Anſwer, and ſo many have given *true Anſwers*, that *One* of our *ingenious* Correſpondents (among the Mines, who is willing to *defend* his other *Miſtakes*, detected by one of our very worthy and very capable Correſpondents) affirms that this *Queſtion* is *impoſſible*, with the preſent *Data*, becauſe *(he ſays)* that the *evacuating* Cocks together diſcharge more *(in the ſame Time)* than the *ſupplying* Cocks fill. Who computes that the Time of *filling* the *Reſervoir* by the 3 *ſupplying* Cocks $= \frac{6\times8\times10}{6\times8+6\times10+8\times10} = 2^{h}.55319$, *&c.* and the Time of *emptying*, or of the *Reſervoir*'s running out, $= \frac{9\times11\times13}{9\times11+9\times13+11\times13} = 3^{h}.58495$, *&c.* ſuppoſing the *Reſervoir* full, and the ſupplying Cocks ſtopped, and evacuating Cocks open. Whence he infers the *Impoſſibility* of ever filling the *Reſervoir* by the ſupplying and emptying Cocks as given ; but whether from *true Principles* muſt be ſubmitted : On which Account (without mentioning any Name) we have ſet down the Deductions, as ſent us by himſelf, from his own *Principles*, for the *Curious* to examine, as we pretend not to underſtand them, though we are willing to find Truth. If he is *wrong*, it is hoped that our Correſpondents, in general, will be the more *cautious* of making erroneous Aſſertions. He concludes with a *curious Remark*, that, the Ciſtern or Reſervoir being full, and the ſupplying and evacuating Cocks diſcharging equal Quantities in the ſame Time *(preciſely,)* the *Reſervoir* would *never* be empty, but would remain full for ever, or for Time *ad Infinitum*, *viz.* $Q + a - a = Q$, for ever.

**V.** QUESTION 475, *anſwered by Mr.* Richard Dalton, *of* Pool, Carmarthen.

Put $x =$ the Thickneſs of the *Ring*, $a = 2.8$, $c = .7854$, $b = 3.1416$, $d = 10.3592$, $=$ Ounces *Troy* in a cubic Inch of Gold. Therefore, $a - x =$ Circumference ; and, by Mr. *Emerſon*'s *Menſuration*, *P.* 113, $\frac{a - x - bx}{b} \times cx^2 \times b =$ *Solidity* ; whence, $\frac{a - x - bx}{b} \times ax^2 \times b \times d = \frac{1l.\ 1s.\ 1d.\frac{1}{4}}{4l.}$ : Reduced and ſolved, $x = 0.1183$ nearly, the *Thickneſs* of the Ring ; and $a - x = 2.6817$ Inches, the Thickneſs of the Ring added to the Circumference. W.W.R.

Mr. *Alexander Rowe* anſwers it thus. — As 4*l.* : 1 *Oz* :: 1*l.* 1*s.* 1*d.*$\frac{1}{4}$ : .2638 *Oz.* By Tables, *P.* 121, *Ward*'s *young Mathematician's Guide*, the Weight of a *cubic* Inch of fine Gold $= 10.359273$ Ounces *Troy.* Whence, .2638 *&c.* $\div$ 10.359273 $=$ .0254653 *Parts* of an Inch $=$ *Ring*'s Solidity.

Put $a = 2.8$ Inches, $b = .0254653$, $c = 3.1416$, and $x =$ *Thickneſs* of the Ring. By the *Queſtion*, $a - x =$ the Ring's outward Circumference, $\frac{a - x}{c} =$ its whole Diameter, $\frac{a - x}{c} - 2x =$ the inner Diameter, and $a - x - 2cx =$ the outer Periphery, and $a - x - cx =$ the mean Circumference; Whence, $\frac{cx^2}{4} \times \overline{a - x - cx} = b$. Reduced, we have $x^3 - .6760672x^2 = -.0078287$ ; ſolved, $x = .11845$, the *Thickneſs* of the Ring ; and the other *Dimenſions* follow ; $a - x = 2.68155$ Inches, the *Thickneſs* of the Ring added to the Circumference ; $\frac{a - x}{c} = .8535$ *&c.* the Ring's *whole Diameter* ; $\frac{a - x}{c} - 2x = .6166$, the *Ring*'s mean Circumference. W. W. R.

The ingenious Mr. *John Harriſon*, of *Helſby*, finds (by proper Subſtitution and Deduction) the Thickneſs of the Ring .1183+, whence the Reſt of the *Dimenſions* follow. Mr. *James Lamb*, by a *Proceſs* of the 3d Power, has found the *Thickneſs* of the *Ring* to be .1185, (nearly agreeing with Mr. *Rowe*'s Number,) thence the outward Circumference $= 2.6815$, and inner Diameter $=$ .6165459. Mr. *Joſeph Hartley*, of *Lewes*, from a correct *Proceſs* and Solution of the *final* Equations, finds the *Thickneſs* of the *Ring* $=$ .1185, *(like a Workman!)* thence the *outward* Circumference 2.6815 Inches, confirming the Truth of the foregoing Numbers. The expert Mr. *Wm Hayes* finds .118 *&c.* for the Ring's *Thickneſs* ; but moſt of our other Correſpondents either wrought not the *numeral* Anſwer out from the final Equation, (which we look upon as doing Nothing, or Time thrown away, and ſuch literal Solutions not worth Notice *unconfirmed* by Numbers,) or elſe gave Numbers ſo wide of Truth, that they would prove their Want of practical *arithmetical* Talents to produce them.

*Literal Solutions* only (we would have it henceforward obſerved) are not worth our Notice, as being unfit for Publication. The Numbers, agreeing with and confirming one another, ſtamp the Worth on every Solution by *literal Arithmetic*; and only Theory reduced to *Practice*, the *numeral Proofs*, make Solutions contain real Worth. — *Gemini*, of *Morpeth*, by a curious Proceſs and final Equation of the 3d Power, finds the Ring's Dimenſions nearly as before.

VI. QUESTION 476, *anſwered by Mr.* John Shadgett, *of* Roſs, Herefordſhire.

SUBTRACT the 3d given Eq. from the 2d, and the *Remainder* will be $w^2-w+x-x^2=20$, or $w^2-w=x^2-x+20$. Now it is eaſy to ſee that $w$ and $x$ muſt be two ſuch Numbers, as that, being taken from their reſpective *Squares*, the Difference of theſe Differences will be 20; and it appears, by *Inſpection* only, that the Numbers 5 and 1 have this Property. Subſtitute, therefore, 1 inſtead of $x$, and 5 for $w$, in the 1ſt, 3d, 4th, and 5th, given Equations, and they will be reduced to $v^2+y+z=100$, $v+y+z=44$, $v+y^2+z=316$, and $v+y+z^2=386$; the 2d of which ſubtract from the other three, *ſeverally*, and we ſhall have $v^2-v=56$, $y^2-y=272$, and $z^2-z=342$; whence, by completing the *Square* of each, $v=8$, $y=17$, and $z=19$: From all which it appears that the *Lady* has loſt her HEART.

The ingenious Mr. *Stephen Hartley*, of *Sowerby-Bridge*, has made the ſame Obſervations, and gives the Anſwer in the ſame Manner.

Mr. *Wm Hayes* proceeds as follows. — Subtract the 3d Equation from the 2d, and $w^2+x-x^2-w=20$. It is evident, from the 1ſt Equation, that $x$ cannot exceed 3; therefore, in this Equation, $x$ is found $=1$, and $w=5$; whence $v=8$, $y=7$, and $z=19$; and the *required Word* is HEART.

Mr. *Joſeph Hartley*, of *Lewes*, anſwered this *Queſtion* from the ſame *Principles*, by a *complex* final Equation.

Mr. *Richard Dalton*, of *Pool*, *Carmarthen*, proceeds thus: — The *third* given Equation being taken from the *ſecond*, and the Square completed, $w=\sqrt{\frac{1}{4}+20+x^2-x}+\frac{1}{2}$, where it is plain that $w$ is greater than 4; but $x=\sqrt{\frac{1}{4}+20-w^2+w}+\frac{1}{2}$, which makes it alſo *evident* that $w$ is leſs than 6, which conſequently will be found $=5$, and $x=1$; therefore, by *ſimple Quadratics*, $y=17$, $z=19$, and $v=x$; anſwering to HEART, which the *poor Lady* loſt. — *Gemini*, of *Morpeth*, anſwered it in the ſame *elegant* Manner.

Mr. *Gumley* ſubtracts the 2d from the 1ſt Equation, and $v^2-w^2+w-v=36$; whence, by a *few* Trials, $v=8$, and $w=5$; from the 2d Equation, $w^2-x^2+x-w=20$, or $20-x^2+x=20$, (by Subſtitution of 5 for $w$.) Here $x=1$. From the 4th take the 3d Equation, and $x^2-y^2+y-z=70$. Hence, by proceeding as above, $y=17$, and $z=19$.

*Therefore the Lady, to her Coſt,*
*Her* HEART, *or her Affections, loſt.*

Mr. *Draper* anſwered this *Queſtion* by the ſame *Principles*; but his other Anſwers are without Numbers wrought out, and therefore of no Uſe.

Mr. *William Wells* obſerves, in Anſwer to this *Queſtion*,

Th' *Equations* ſolv'd, the *Numbers** tell
The *Lady*'s loſt her HEART;
Which having *found*, I'd have her well
To guard that tender Part.

*8, 5, 1, 17, 19.

Mr. *Fininley*, by a complicated *final* Equation, had from the ſeveral given Equations, finds the Anſwer to be HEART; as does Mr. *Nicholſon*, Mr. *Potts*, Mr. *Hardy*, Mr. *Rowe*, Mr. *George Perrot*, and Mr. *Joſeph James* of *Stoke-Biſhop*.

Mr. *John Harriſon*, Mr. *Thomas Robinſon*, Mr. *Pen*, and Mr. *Michael Taylor* anſwered it.

**VII.** QUESTION 477, *anſwered by Mr.* Joſ. James, *of* Stoke-Biſhop, *near* Briſtol.

THE Value of $z$, in the firſt Equation, is $41-yz$; and, in the ſecond, $\frac{89-y}{z}=41-yz$; from whence, $y=\frac{41z-89}{z^2-1}$; ſince $y$ and $z$ muſt both be whole poſitive Numbers leſs than 25, by a few *Trials* $y$ is found $=5$, $z=4$, and $x=21$; ſo that I find *Sophia* conſented to WED, "*To eaſe her* Horner's *Care*."

*The ſame anſwered by Mr.* James Lamb, *at* Aldbrough, *near* Hull.

| | | | |
|---|---|---|---|
| GIVEN | 1 | $x+yz=41=a$ | $x=?$ |
| | 2 | $y+xz=89=b$ | $y=?$ |
| | 3 | $z+xy=108=c$ | $z=?$ |
| 1, $-yz$ | 4 | $x=a-yz$. | |
| 2, $-y\div z$ | 5 | $x=\frac{b-y}{z}$. | |
| 3, $-z\div y$ | 6 | $x=\frac{c-z}{y}$. | |
| 4 and 5 | 7 | $\frac{b-y}{z}=a-yz$. | |
| $7\times 2$ | 8 | $b-y=az-yz^2$. | |
| $8+yz^2-b$ | 9 | $yz^2-y=az-b$. | |
| $9\div z-1$ | 10 | $y=\frac{az-b}{z^2-1}$. Put this Value for $y$ in 4th. | |
| And 6th Equat. | 11 | $a-\frac{az^2-bz}{z^2-1}=\frac{cz^2-c-z^3+z}{az-b}$. | |
| Reduced & ſolved | 12 | $z=4$; whence $y=5$, and $x=21$; anſwering to the 3 Letters in the *Alphabet*, compoſing the Word, WED. W.W.R. | |

*Gemini*, of *Morpeth*, anſwered this *Queſtion* correctly, by the ſame Sort of ſhort Proceſs.

Mr. *George Perrot* anſwered it the *ſame* by a different but ſhort *Proceſs*; as did Mr. *Rowe*.

Mr. *Wm Hardy* anſwered it by a ſhort Proceſs and Trial and Error.

Mr. *Potts* anſwered it by an *Equation* ſimilar to the above. Mr. *G. Hicks* gives a ſhort Anſwer. *Cleonicus*, of *Kendal*, ſolved it by an Equation of the 5th Power. Mr. *James Nicholſon*, of *Stanton*, ſolved it; Mr. *Dalton*; Mr. *Wm Hedley*, of *Durham*, by an Equation ſimilar to Mr. *Lamb*'s above; Mr. *Wm Fininiey*, by a complicated final Equation; Mr. *Wm Wells*, by a difficult Equation; Mr. *Robert Arnold*, junior, by an Equation; Mr. *Muſcroft*, by an Equation; Mr. *Joſeph Hartley*, ſhortly, by an Equation; and Mr. *John Wilſon*, of *Aldbrough* School. Mr. *Shaw* obſerves, in his Anſwer,

> Sophy, *who gave Conſent to* WED,
> *With Honours crown'd her Lover's Head.*

Mr. *Gumley*, after anſwering this *Queſtion* by an Equation, obſerves,

> *Therefore, that all might be well ſaid,*
> Sophy *gave* Horner *Leave to* WED.

Mr. *John Harriſon* anſwered it; as did Mr. *Wm Hayes*, Mr. *Thomas Robinſon*, and Mr. *Stephen Hartley*, who obſerves,

> *When* Sophy *did her* Horner WED,
> *She planted Honours on his Head.*

Mr. *Pen* anſwered it; as did Mr. *Shadgett*, by an elegant Equation; Mr. *Fatherley*; Mr. *Sandys*; Mr. *Taylor*; and Miſs *Sally Hill*.

### *Second* VII. QUESTION 478, *anſwered by Mr.* Joſeph James, *of* Stoke-Biſhop.

GIVEN, $\frac{\sqrt{x^3}-\sqrt[3]{x^4}}{\sqrt[3]{x}}=x$; whence $x\sqrt{x}-x\sqrt[3]{x}=x\sqrt[3]{x}$; dividing by $x$, then $\sqrt{x}-\sqrt[3]{x}=\sqrt[3]{3}$. Hence, by Tranſpoſition, $\sqrt{x}=2\sqrt[3]{x}$; for $x$ put $y^6$; then $y^3=2y^2$, or $y=2$; whence $y^6=x=64$.
W. W. R.

Mr. *Harland* reduces the *Notation* to $x^{\frac{3}{2}}-x^{\frac{4}{3}}=x^{\frac{4}{3}}$, when (by Tranſpoſition) $x^{\frac{3}{2}}=2x^{\frac{4}{3}}$, the ſame as (ordering the *fractional Indices*) $x^{\frac{9}{6}}=2x^{\frac{8}{6}}$; (divide each Side by $x^{\frac{8}{6}}$) and $x^{\frac{1}{6}}=2$; involve which Equation to the 6th Power, and $x=64$, the *Anſwer*.

Mr. *Joſeph Hunt*, junior, of *Winſlow* School, anſwered it in *Numbers* only.

Mr. *Sandys* ſubſtitutes properly, at once, $y^6=x$; then the Equation becomes $\frac{y^9-y^8}{y^2}=y^6 \because y^7-y^6=y^6$, or $y^7=2y^6$; whence $y=2$, and $y^6=64=x$, as before; being the *genuine Method* of Solution, without *going about the Wood*.

Mr. *Fatherley* anſwered the ſame; as did Mr. *Hartley*, of *Sowerby-bridge*; Mr *Robinſon*; Mr. *Hayes*; Mr. *Harriſon*, by the *genuine Method*; and Mr. *Gumley*, who ſays, very *poetically*,

> Your *Queſtion*, I own, was *well form'd* to perplex,
> Yet I've found 64 is the Value of *x*.

Mr. *John Wilſon* anſwered it *ſhortly*; as did Mr. *Dalton* very *conciſely*; Mr. *Joſeph Hartley*, by a ſhort Reduction, without Subſtitution; as likewiſe did Mr. *Shaw*: and Mr. *Shadgett*, very elegantly. Mr. *Wm Wilſon*, Mr. *Fininley*, Mr. *Hedley*, Mr. *Nicholſon*, Mr. *Hill*, *Cleonicus*, Mr. *Hardy*, Mr. *Rowe*, Mr. *Lamb*, and Mr. *Perrot*, gave elegant and ſimilar Anſwers. Alſo Mr. *Michael Taylor* and Miſs *Sally Hill* anſwered it.

### VIII. QUESTION 479, *anſwered by Mr.* Joſeph James, *of* Stoke-Biſhop.

PUT $w$, $x$, $y$, and $z$, reſpectively, for each Part of the 100 Guineas.

By *Queſt.* 1 | $w+x+y+z=$ 100 Guineas $=$ 100800 Farthings.

$$\left.\begin{array}{r|l} 2 & \frac{z}{5}=5y. \\ 3 & 5y=w+5. \\ 4 & w+5=x-5. \end{array}\right\}$$

In the 4th *Equation*, $w=x-10$; this put in the 3d, $y=\frac{x-5}{5}$; which Value of $y$ put in the 2d Equation, we have $z=5x-25$; *laſtly*, for $w$, $y$, and $z$, in the 1ſt Equation, write their reſpective Values, and by

| | | *Farthings.* | *l.* | *s.* | *d.* | *q.* |
|---|---|---|---|---|---|---|
| Reduction we get | $x=$ | 14005 $=$ | 14 | 11 | 9 | 1 |
| and, from above, | $w=$ | 13995 $=$ | 14 | 11 | 6 | 3 |
| | $y=$ | 2800 $=$ | 2 | 18 | 4 | 0 |
| | $z=$ | 70000 $=$ | 72 | 18 | 4 | 0 |
| | *Proof* | 100800 | £.105 | 0 | 0 | 0 |

Mr. *John Sandys*, of *Thedleſton*, near *Derby*, anſwered it thus.

$$\left\{\begin{array}{r} 2.7777\cancel{7}\\ 8.8888\cancel{8}\\ 18.8888\cancel{8}\\ 69.4444\cancel{4}\\ \hline \text{Sum } 99.9999\cancel{9}\end{array}\right\}\text{ Parts of a Guinea.}$$

Mr. *Harland* anſwered it the ſame ; ſo did Mr. *J. S. Watcborne*.

Mr. *Nicholſon*, putting $u$, $w$, $x$, and $y$, for the 4 Parts, judiciouſly makes $v+w+x+y=100=a$.

$$\left.\begin{array}{r} v+5=z\\ w-5=z\\ 5x=z\\ \frac{y}{5}=z\end{array}\right\}\text{whence}\left\{\begin{array}{l} v+10=w.\\ \frac{v+5}{5}=x.\\ \overline{v+5}\times5=y.\end{array}\right\}$$

Theſe Values put in the 1ſt Equation give $2v+10+\frac{v+5}{5}+5v+25=100=a$. Whence, $36v=320$, and $v=8\frac{8}{9}$.

*Guineas.*

$v=8$ 8-9ths
$w=18$ 8-9ths
$x=2$ 7-9ths
$y=69$ 4-9ths
} as before.

Sum 100 Guineas.

Mr. *Richard Dalton*, of *Pool*, gave general *Theorems* that reduce to the foregoing Values very correctly ; but we have not ſeen any Method ſhorter than the above by Mr. *Nicholſon*.

However, as Mr. *Dalton*'s *Theorems* are ingenious, we give them, as follow.

Let $a=$ the Parts to be added to, ſubtracted from, multiplied and divided by, $b=$ the Number to be divided into thoſe ſeveral Parts, repreſented by $x$, $y$, $z$, and $r$; then $x=\frac{ba-a^3-2a^2-a}{a^2+2a+1}$, $y=\frac{ba+a^3+2a^2+a}{a^2+2a+1}$; $z=\frac{ba^2}{a^2+2a+1}$, and $r=\frac{b}{a^2+2a+1}$, *univerſally*, in all Caſes.

Mr. *Hedley* has determined the Numbers neatly thus. — Put $a=105l.$ $x$, $y$, $z$, and $u$, the *required Parts*, then, by *Queſt.* $x+y+z+u=a$; and $x+b=y-b=bz=\frac{u}{b}$, (by putting $b=5$,) therefore $x=bz-b$, $y=bz+b$; and $u=b^2z$. Conſequently, $2bz+b^2z+z=a$; hence $z=\frac{a}{2b+b^2+1}$.

Here $u=$ 2 11-12ths
and $x=$ 9 7-12ths
$y=$ 19 7-12ths
$z=$ 72 11-12ths
Sum 105 *l.*

The Value in *Pounds Sterling*, and not in *Guineas* ; but like the *firſt* found Numbers in *Farthings*.

Mr. *Ward* has determined the very ſame Numbers in *Pounds* and *Parts Sterling* ; ſo has Mr. *Fininley* by an eaſy and correct Proceſs.

Mr. *Wm Wells* anſwered it by a *Proceſs* ſimilar to Mr. *Dalton*'s.

*Gemini*'s ſhort Anſwer is thus. — Put $x$, $y$, $z$, and $w$, for the Parts ; then $x+5=5z=\frac{w}{5}$. Hence, $y=x+10$, $z=\frac{x+5}{5}=\frac{1}{5}x+1$, and $w=5x+25$; $\because 7\frac{1}{5}x=64$; hence $x=8$ 8-9ths, $y=18$ 8-9ths, $z=2$ 7-9ths, and $w=69$ 4-9ths, *Guineas* and *Parts*.

Mr. *Draper* has alſo determined the Parts of 100 Guineas truly. Mr. *Shadgett* has determined the ſame Parts by a very curious and ſhort Method, like Mr. *Nicholſon*'s; ſo has Mr. *Joſeph Hartley*. Meſſrs *Wadford* and *Wilſon* have given the Parts of 105*l.* *Sterling* for 100 Guineas. Mr. *Gumley* has given the Parts of 100 Guineas very *mathematically* and correctly. Mr. *Harriſon* has given the Parts of 105*l.* Sterling; who, and ſome other Correſpondents, complain that *ſimilar Queſtions* to this, and Others, in the *Palladium*, are in Books of eminent Authors; where they may ſee Queſtions *ſimilar* to thoſe in other Authors of Eminence; for *Similarity* is not the *ſame*, nor yet a Robbery of *Invention*; — *Houſes* are built by the *Plans* of other Houſes, and yet each Houſe has its *Utility*, with Variations and Improvements. — Mr. *Hayes* ſolves this *ſimilar* Queſtion to one in *Simpſon's Algebra*, *Prob.* 35, *P.* 96, (many of whoſe *Queſtions* are *ſimilar* to thoſe in other Books, eſpecially in *French* Authors, for *Simpſon* was a Borrower from, and Improver of, ſeveral Authors,) and, purſuing the *ſame Method* that *Simpſon* did, and that Others did before him, finds the *Parts* of 100 Guineas, as *already* determined by Others. Mr. *Robinſon* determines the Parts of 105*l.* correctly. Mr. *Stephen Hartley* finds the Parts of 100 Guineas. Mr. *Pen* finds the Parts of 105*l.* Mr. *James Egginton*, late of *Litchfield*, but now of *Burton upon Trent*, in *Staffordſhire*, finds the Parts of 100 Guineas; Mr. *Rowe* the ſame. Moſt falling into the *Track* of Others, without infringing on each Other's Merit. Mr. *Lamb* gives the Parts of 105*l.* according to Mr. *Emerſon's Method*, in his *Algebra*, he ſays. Mr. *Wm Wilſon* gave the Parts of 100 Guineas; Mr. *Hardy* the ſame; Mr. *Perrot* and Mr. *Potts* the ſame. Mr. *Shaw* found the Parts of 105*l.* as did Mr. *Thomas Elliot*, of *Mythom-bridge*, *Derbyſhire*, and Mr *George Hicks*. Mr. *Watchorne* by Parts of 100 Guineas; as did Mr. *Hill*, and Mr. *Drake*.

### IX. QUESTION 480, *anſwered by Mr.* George Perrot, *of* Heſſle.

PUT $x = 1$ *French* Crown, $y = 1$ Dollar, $z = 1$ Ducat: Then,

$$\begin{array}{r|r|l}
 & \begin{array}{r}1\\2\\3\end{array} & \left.\begin{array}{l}20x+12y+10z=210\ \textit{Shillings}\\24x+16y+12z=260\\30x+15y+45z=482\end{array}\right\}\textit{Per Queſt.} \\
\hline
\begin{array}{r}1\times6\\2\times5\end{array} & \begin{array}{r}4\\5\end{array} & \left.\begin{array}{l}120x+72y+60z=1260\\120x+80y+60z=1300\end{array}\right\}\left.\begin{array}{l}1\times24\\2\times20\end{array}\right\}\div4\left\{\begin{array}{l}1\times6.\\2\times5.\end{array}\right. \\
5-4 & 6 & 8y=40,\ \text{th.}\ y=\frac{40}{8}=5s.\ \left.\begin{array}{l}\\ \\ \end{array}\right\}\begin{array}{l}\text{Put the Value of } y \text{ in the ſecond}\\\text{and third Steps, aud tranſpoſe}\\\text{them; then,}\end{array} \\
 & \begin{array}{r}7\\8\end{array} & \begin{array}{l}24x+12z=180.\\30x+45z=405.\end{array} \\
\begin{array}{r}7\times5\\8\times4\end{array} & \begin{array}{r}9\\10\end{array} & \left.\begin{array}{l}120x+60z=900\\120x+180z=1620\end{array}\right\}\left.\begin{array}{l}7\times30\\8\times24\end{array}\right\}\div6\left\{\begin{array}{l}7\times5.\\8\times4.\end{array}\right. \\
10-9 & 11 & 120z=720,\ \text{th.}\ z=\frac{720}{120}=6s.\ \left.\begin{array}{l}\\ \\ \end{array}\right\}\begin{array}{l}\text{whence (by}\\\text{7thStep, } x=\end{array}\left\{\frac{108}{24}\right.=4s.\ 6d.
\end{array}$$

Hence, 1 *French* Crown $=4s.\ 6d.$ 1 Dollar $=5s.$ and 1 Ducat $=6s.$ W.W.R.

*Gemini*, of *Morpeth*, anſwers this *Queſtion* in the ſame Manner.

Notwithſtanding this Kind of *Queſtion* is in more eminent Authors than one, (who copy from each other's *Plans* without a Crime, as *Virgil* copied from *Homer*, and *Milton* from both,) yet it was propoſed in the *Palladium* for 1773 as a *Pattern*, to give a *Solution* by, in the moſt *conciſe*, *eaſy*, and *practical*, *Way*. If any of our Correſpondents think the *Imitation* of other *Plans*, or *Patterns*, of *Queſtions*, is a Fault, without any Regard to the Merit of an *improved Solution*, (ſuch an one as the foregoing appears to be,) they ſhould ſend us *new Plans* of their own, with the beſt Kind of Solutions, to *rival* all Improvements made before them.

Mr. *Shadgett* ſolved this *Queſtion* according to his uſual *Brevity* and *Elegance*; but, the *Steps* not being ſo *conſpicuous* in this *Caſe* as when ſet down in *Gradations* under each other, we have given the *practical Pattern* of Solution, for Example and Method, as the moſt intelligible to Pupils at School; this Sort of *Queſtions* being intended for the Improvement of Youth at School in *Literal Arithmetic*. A conciſe Treatiſe of which, under that *Title*, in familiar Terms and Examples, we expect to publiſh, for the Uſe of Schools and private Enquirers.

Mr. *Dalton* elegantly and ſhortly ſolved this *Queſtion*; as did Mr. *John Wilſon*, (a Youth of 14 in *Aldbrough* School,) by *literal Arithmetic*. Our *poetical* Friend, Mr. *Gumley*, anſwered it by a Method *truly mathematical*. Mr. *Harriſon* anſwered it truly by a ſhort Method; as did Mr. *Stephen Hartley*, Mr. *Pen*, Mr. *Hardy*, Mr. *Marſden*, Mr. *Elliot*, *Cleonicus*, Mr. *James Hartley*, and Mr. *Lamb*, (by a Method like Mr. *Perrot*'s.) Mr. *Rowe* ſhortly anſwered it; as did Mr. *Wells*, Mr. *Fininley*, Mr. *Wm Wilſon*, Mr. *Harland*, Mr. *Hedley*, Mr. *Muſcroft*, Mr. *Ward*, and Mr. *Hicks*. Mr. *Robinſon* anſwered it by a *ſhort Proceſs*, like Mr. *Perrot*'s inſerted, but with *Contractions*. Mr. R. *Arnold*, jun. anſwered it. Mr. *James*, by a judicious Reduction of the Equations given, (to $10x+6y+5z=1260$ Pence, $6x+4y+3z=780$ Pence, $2x+y+3z=384$ Pence,) finds very neatly and conciſely, by a Compariſon of them, their ſeveral Values, as found by Mr. *Perrot* and Others. Mr. *Hayes* reduces the 3 Equations to $10x+6y+5z=105$ *s.* $6x+4y+3z=65$ *s.* and $2x+y+3z=32$ *s.* Then 1 by 3, and 2 by 5, ſubtracting the greater from the leſs, $2y=10$, and $y=\frac{10}{2}=5$ *s.* whence $x=4$ *s.* 6 *d.* and $z=6$ *s.* Mr. *Potts* alſo gave a good Solution, as did Mr. *Fatherley*. Mr. *Nicholſon* anſwered it; as did Mr. *Hill*, Mr. *Taylor*, Mr. *Drake*, and Miſs *Hill*.

### X. QUESTION 481, *anſwered by Mr.* G. Coughron, *of* Newcaſtle upon Tyne.

PUT $.5=a$, $2=c$, $500=p$, and $1.04=r$; then will $ar^{x-1}$, $acr^{x-2}$, $ac^2r^{x-3}$, be the Amounts of the *firſt*, *ſecond*, and *third* Receivings, reſpectively, at the End of $x$ Years, from the Time that the Money was lent; and therefore, $a \times : r^{x-1} + cr^{x-2} + c^2r^{x-3} + c^3r^{x-4}$, to $x$ Terms, will be the *Amount* of all the *Receivings*, at the End of $x$ Years, $= a \times \frac{c^x - r^x}{c-r}$; but $pr^x$ will be the Amount of $p$, in the ſame Time, and, conſequently, (*per Queſt.*) $pr^x - a \times \frac{c^x - r^x}{c-r}$, or $mr^x - c^x =$ a *Maximum*, and to 0, where $m = 1 + p \times \frac{c-r}{a}$; now, by making the Fluxion of $mr^x - c^x = 0$, we have $mr^x \times \text{Log.}\, r = c^x \times \text{Log.}\, c$, or $m \times \frac{\text{Log.}\, r}{\text{Log.}\, c} \times r^x = nr^x = c^x$; and therefore, by taking Logs. $\text{Log.}\, n + x \times \text{Log.}\, r = x \times \text{Log.}\, c$; from whence $x = \frac{\text{Log.}\, n}{\text{Log.}\, c - \text{Log.}\, r} = 2.604$, &c. which would be the Time when the *Debt* was *greateſt*, were a *proportional* Part of the *Receivings* received every *Moment*, as it became due; but, as this is not the *Caſe*, and it is only received *yearly*, it is evident that the *Debt* will be greater (*in the preſent Caſe*) at the End of the 3d Year, juſt before the *Sum* for that Year is received, than it will be at the above Time; and it is alſo evident, that the *Debt* muſt be greater at the End of that Year *juſt* before its correſpondent Sum is received, when the ſaid Sum *firſt* exceeds the *Intereſt* of the remaining Debt, after this *Receiving* for 1 Year; and therefore it is plain that, in the preſent Caſe, the *Debt* will be the *greateſt* at the End of the 4th Year, *juſt* before the 40*l.* for that Year is received. —— Again, when $mr^{x} - c^{x} = 0$, we have Log, $m+x$ $+$ Log. $r = x \times$ Log. $c$, and $x = \frac{\text{Log. } m}{\text{Log } c - \text{Log. } r} = 6.99575$, &c. for the Time when the *Principal and Intereſt* will be received; at the End of the 7th Year, very nearly. W. W. R.

Mr. *Robinſon* anſwers one Part of the *Queſtion* thus. —— Let $x =$ Years when the Principal and Intereſt will be received; then, As 100 : 41 :: 1 : ,04; therefore, $500 \times \overline{1.04}|^{x} = \frac{5 \times \overline{2}|^{x} - 5}{2-1}$; this Equation ſolved, by the Method of *Trial and Error*, $x = 7.053$ Years; in which Time the *Principal* and *Intereſt* will be received. —— He takes no Notice when the Debt will be the *greateſt poſſible*, in which Mr. *Coughron*'s Reaſoning is diſtinguiſhed.

Mr. *Wm Fininley* has determined the Time, by a *Series*, 6.994 Years, when the *Principal* and *Intereſt* will be paid.

Mr. *Alexander Rowe*, puts $p = 500$, $r = 1.04$*l.* $x =$ the Time in which the Debt will be the *greateſt*. By geometrical Progreſſion, $\frac{5 \times 2^{x} - 5}{2-1} = 5 \times 2^{x} - 5 =$ Sum of the yearly Payments, and $pr^{x} =$ the Amount of the *Principal*, $p$, in the ſame Time. Whence, by *Queſt.* $pr^{x} - 5 \times 2^{x} + 5 =$ a *Maximum*; which will be ſo when $x = 3$ Years, [*Why ſo ?*] or at the End of the 3d Payment. Again, let $x$ denote the Time (from the putting out) in which the *whole* Debt will be received, the *Reſt* remaining the ſame as before; then will $5 \times 2^{x} - 5 = pr^{x}$; and therefore $5 \times 2^{x} - pr^{x} = 5$. Solved, by *Trial and Error*, $x = 7.0538$ Years. Q. E. F.

Mr. *Hardy*, the Propoſer, anſwers it thus. —— Put $p = 500$, $x =$ (the Amount of 1*l.* with its Intereſt for 1 Year) 1.04, $a = 5$*l.* $=$ 1ſt Payment, and $d = 2$, the Multiplier; and put $t =$ Time *required*. Then, the whole Amount of $p$, in $t$ Time, will be $pr^{t}$. Now, if the 1ſt Payment, 5*l.* ($a$) had continued out at Intereſt to $t$ Time, its Amount would *evidently* be repreſented $a - r^{t-1}$; ($a$ being due only at the End of the 1ſt Year;) ſo likewiſe, if the 2d Payment, 10*l.* or $ad$, had continued out to the End of the Time $t$, then its Amount would be repreſented by $adr^{t-2}$, &c. whence the Continuation of the *Series* is manifeſt; *viz.* $ar^{t-1} + adr^{t-2} + ad^{2}r^{t-3} + ad^{3}r^{t-4}$ &c. to $t-1$ Terms; therefore the laſt Term $= d^{t-1} \times ar$. Which *Series* being Nothing but an arithmetical Progreſſion, its Sum is eaſily found

$= \frac{ard^t - ar^t}{d-r} =$ Sum of all the Payments excluſive of the laſt. Hence $pr^t = \frac{ard^t - ar^t}{d-r}$, or $\frac{dpr^t - prr^t - ar^t - ard^t}{d-r} =$ a *Maximum*. —— If we put $dp - pr - a = f = 475$, $b = ar = 5.2$, and $c = \frac{1}{d-r} = 1.0416$ &c. Then, by Subſtitution, $cfr^t - cbd^t =$ a *Maximum.* If $cf = e = 491.7916$ &c. and $cb = n = 5.416$ &c. we ſhall have, by Subſtitution, $er^t - nd^t =$ a *Maximum.* Let $d =$ hyperb. Log. of $r = 0.03922062278$ &c. and B $=$ hyperb. Log. of $d = 0.693147192653$ &c. Then, $\dot{t}edr^t - \dot{t}nBd^t = \dot{0}$. Therefore, $edr^t = nBd^t$. Put $\frac{ed}{nB} = G = 5.1373371$; it follows that $t = \frac{\text{Log. } G}{\text{Log. } d - \text{Log. } r} = 2.491447875 =$ 2 y. 6 m. 1 w. 3 d. 21 h. 17 m. 19 s. + &c. when the Debt is the *greateſt.*

Again, $pr^t = \frac{ard^t - ar^t}{d-r}$; if $m = pd - pr + a = 485$, and $n = ar = 5.2$; then $mr^t = nd^t$; in Logs. $t = \frac{\text{Log. } nn - \text{Log. } n}{\text{Log. } dd - \text{Log. } r} = 6.935779 =$ 6 y. 12 m. 0 w. 4 d. 14 h. 57 m. 55 s. + &c. when the whole Debt will be paid off, by *Principal* and *Intereſt* received. W. W. R.

⁂ *Some of our Correſpondents make no Work in anſwering this Queſtion, while they ſhine in anſwering other Queſtions.*

XI. QUESTION 482, *anſwered by Mr.* G. Coughron, *of* Newcaſtle upon Tyne.

PUT $a = 4$, $c = \frac{1}{100}$, $r =$ the Amount of 1*l.* in 1 Year at the Rate of Intereſt which the *Parties* agree to allow each Other, and $x$ for the Years the Lady ought to live to ſatisfy the Conditions of the *Queſtion.* Then will $aS \times \overline{r-1}$ be the Sum which the Lady receives yearly, and its Amount *(Compound Intereſt)* $= aS \times \overline{r-1} \times \overline{r^x - 1} \div \overline{r-1} = aS \times \overline{r^x - 1} =$ the Value of the Sum ſhe will have received at her Death; but $Sr^x$ will be the Sum that is due to her at that Time; whence, $Sr^x - \overline{aS \times r^x - 1} = cS$, *per Queſt.* which, reduced, gives $r^x = \frac{a-c}{a-1}$; hence $x = \text{Log.}\frac{a-c}{a-1} \div \text{Log.}\, r = \frac{\text{Log.}\,\overline{a-c} - \text{Log.}\,\overline{a-1}}{\text{Log.}\, r} = 7.27115$ &c. Years, when $a = 4$, and $c = \frac{1}{100}$ as *per Queſt.* and $r$ ſuppoſed $= 1.04$ at the Rate of 4 *per Ct. per An.*

*Scholium*, or *Inference*. —— The *Anſwer* will be the ſame (the other Quantities remaining unaltered) let the *Value* of S be what it will; *(becauſe* S *is now, and not before, ſeen to be multiplied in each Term of the Equation, and dividing off.)* And when $c$ is *greater* than 1, *inferred from the Equation*, the *Queſtion* is *impoſſible*; $x$ then coming out, in that *Caſe*, *negative*. ——Some ſimilar *Remarks* may be made on the *laſt Solution*. —— *Plaudite! Plaudite!*

Mr. *Hardy*'s *Anſwer*, the Propoſer. —— Put $a =$ the Money the *Lady* receives each Year, $r =$ the Amount of 1*l.* with its Intereſt for 1 Year; then the ſeveral Years Payments will be repreſented by $a$, $ar$, $ar^2$, $ar^3$, &c. to $t$ Years. And the *Sum* of this Progreſſion will be $\frac{ar^t - a}{r-1}$. —— The Sum S, at firſt put out, would amount in $t$ Years to $Sr^t$. Let $b =$ the Sum the Banker was to gain; then, $\frac{ar^t - a}{r-1} + b = Sr^t$. In Logarithms, $t = \frac{\text{Log } \overline{b - br + a} - \text{Log. } \overline{a - Sr + S}}{\text{Log. } r}$, *univerſally*. Or, put $d = \overline{b - br + a}$, and $s = \overline{a - Sr + S}$, then $t = \frac{\text{Log. } \frac{d}{s}}{\text{Log. } r}$, *univerſally*. —— *For an Example*, let $S = 100$, $r = 1.05$; then $a = 20$, and $b = 1$; $d = 19.95$, and $s = 15$. Alſo $\frac{\text{Log. } \frac{19.95}{15}}{\text{Log. } 1.05} = 5.845$, or 5 y. 10 m. 3 w. 6 d. 13 h. 55 m. nearly.

Now, ſuppoſe that the Banker had gained Nothing, then, $t = \frac{\text{Log. } 1\frac{1}{3}}{\text{Log. } 1.05} = 5.89631$, or 5 y. 11 m. 2 w. 4 d. 6 h. 9 m. nearly.

If the *Sum* S had been put out at *Simple Intereſt*, and retained the ſame *Conditions*, then $r = .05$; and the *Progreſſion* would have been $20 + 21 + 22 + 23$, &c. which, to $t$ Times the *Sum*, makes $\frac{40t + t^2 - 2}{2}$; and the Amount of $S = S + Srt$. —— Hence, $\frac{40t + t^2 - 2}{2} = S + Srt + b$; ſolved, $t = \sqrt{425} - 15 = 5.61551849$. When the *Banker* gained Nothing, $t = \sqrt{429} - 15 = 5.721969$. W. W. R.

One of our *ingenious* Correſpondents, who makes the Years very *different* from the Years above, *(viz.* $16\frac{1}{2}$,) *queres* whether his *Solution* agrees with the Propoſer's Meaning; which the Words of the *Queſtion* muſt determine, as they determined his Meaning to Mr. *Coughron*.

Mr. *Robinſon*'s *Anſwer*. ——Let $S =$ the Sum of Money put into the Banker's Hands, $x =$ the Years the *Lady* is to live, *per Queſt.* $p = 100l.$ $r =$ the Rate of Intereſt. As $p : r :: S : \frac{rS}{p} = 1$ Year's Intereſt, $\frac{rSx}{p} =$ whole Intereſt, and $\frac{4rSx}{p} =$ what the Lady is to receive; $\frac{S + rSx - 4rSx}{p} = \frac{S}{p}$

*per Queſt.* Therefore, $px = \frac{pS - S}{3rS}$, the Years *required.* Now, ſuppoſe 1000*l.* is put into the Banker's Hands, at 4 *per Cent.* th. $\frac{pS - S}{3rS} = 8\frac{1}{4}$ Years; if at 5 *per Cent.* = 6 Years and 3-5ths. *Therefore,* the greater the Intereſt, the *ſooner* will the *Banker* get the Lady's Fortune into his Hands. W.W.R.

Mr. *Fininley* anſwers it thus. —— If S = the Sum = 1000*l.* 4 Times the ſimple Intereſt thereof at 5*l.* *per Cent.* is 200*l.* which is to be paid yearly; $\frac{1000}{100} = 10$*l.* which is what the Banker is to gain; then 990*l.* added to the ſimple Intereſt of 1000*l.* at 5 *per Cent.* = what ſhe is to receive. Put $t =$ the Time of her Life, and we have, 200*l.* : 1 y. :: 90+50*l.* : $t$; whence, multiplying Extremes and Means, we have, by Reduction, $t = \frac{990}{150} = 6.6$ = 6 y. 219 d. *required.*

Mr. *Wells* argues thus. —— Suppoſe (ſays he) 100*l.* (= S) be put into the Banker's Hands; let $r = .5$, the Intereſt of 1*l.* for 1 Year at 5 *per Cent.* $t =$ the Time required. Now, ſuppoſe the Banker to make *lawful Intereſt* of the Money put into his Hands, during the Lady's Life, he then loſes $3r$ yearly, the *Principal.* Whence, as $1 : 3r :: t : S-t$, by *Queſt.* *Therefore,* $3rt = S-t$, and, by Reduction, $t = \frac{S-1}{3r} = 6.6$ Years. (Agreeing with Mr. *Robinſon*'s and Mr. *Fininley*'s Anſwers foregoing.) W. W. R.

Mr. *Wells* obſerves, that $6.6 \times 4r = 132$*l.* what the Lady receives during her Life; and, as 1 Yr : 5*l.* :: 6.6 Yrs : 33*l.* the Intereſt of 100*l.* for 6.6 Years; therefore, 100+33—132 = 1*l.* the Banker's Gain at laſt; being 1-hundredth Part of the Principal he received from the Lady.

*Remark.* Compound Intereſt to both Parties ought to be allowed in theſe Caſes, as for the Purchaſe of Annuities; the Banker to be allowed compound Intereſt, for the Lady's Life, for 4 Times as much ſimple Intereſt more, paid her yearly, than the ſimple Intereſt came to; and the Lady to be allowed compound Intereſt for her Money advanced, conſidering the Banker's Gain at laſt on the Contract made between them. Hence only Mr. *Coughron*'s Anſwer is deduced from true Principles, and is a moſt *accurate* Way of Reaſoning and Concluſion, eminently and excellently performed. Yet Meſſrs *Robinſon*'s, *Fininley*'s, and *Wells*'s, Anſwers, on the *Principles of ſimple Intereſt,* and agreeing with each Other, are not without their *particular* Merit, according to the *Principles* on which they proceeded. —— PALLADIUM-AUTHOR.

### XII. QUESTION 483, *anſwered by Mr.* George Coughron.

IT has been ſhewn in former *Palladiums,* (*viz.* for 1767 and 1771,) that the *leaſt* Number that is *diviſible* by each of the Times of *Revolution,* without a *Remainder,* is the *Anſwer*; whence $2 \times 7 \times 8 \times 9 \times 5 \times 11 = 55440$ Hours = 2310 Days, is the Time in which the ſeveral Hands will be all *conjoined,* and is juſt Half the Time that Mr. *Ferguſon* makes it.

*Obſervation.* Mr. *Ferguſon,* who is a Lecturer on *experimental Philoſophy,* ſhould rectify this *Error* to his Pupils, and account (*modeſtly, as not being infallible*) for his Miſtake. PALLADIUM-AUTHOR.

Mr. *Harriſon* anſwers it in the ſame conciſe and correct Manner; as did Mr. *Shadgett,* who determines, that A had performed 2310, B, 2520, C, 2772, D, 3080, E, 3465, and F, 3960, complete Revolutions, at the next Time of their Conjunction,

Conjunction. Mr. *Eggington* has elegantly performed the ſame, coming to the ſame Concluſion with Mr. *Cougbron*. Mr. *James Hartley* performed it by a very *conciſe* and *univerſal Rule*. Mr. *Lamb* finds the Time and Number of Revolutions ſhortly; as did the ingenious Mr. *Hayes*; Mr. *W. Wilſon*; Mr. *Hardy*, who alſo determined the Hours to be 6 y. 4 m. 2 w. at the next Conjunction, which Mr. *Nicholſon* determines to be 6 y. 4 m. 1 w. (by abating one Day for the Leap-Year contained in 6 Years) for the Diſtance of Time *required*; who refers to the *Remark*, P. 39, *Pal.* 1773. Mr. *Fininley* (in his Book of Solutions to moſt of the *Queſtions*) determines, very judiciouſly, the exact Time and Number of Revolutions performed by each Hand. Mr. *Robinſon* gives the exact Time, and alſo Mr. *Taylor*; but one of our capable Correſpondents, by *Inadvertency* or *Inattention*, ſends the Time 1330560 Hours = 55440 Days = $151\frac{1149}{1461}$ Years; obſerved (without Name) for *general Caution*. Mr. *Pen* [gives $7\times8\times9\times10\times11 = 55440$ Hours.

XIII. QUESTION 484, *anſwered by Mr.* George Coughron.

PUT $s$ for the *ſpecific Gravity* of the *Metal*, (which ought to have been given,) that of Water being *Unity*; then, ſince the Sphere ſinks to its Center, its ſpecific Gravity muſt be $= \frac{1}{2}$, *viz.* Half that of Water, and therefore the Content of the whole Sphere, to the Solidity of the metal Part thereof, is as $s : \frac{1}{2}$, or to the *Content* of the Vacuity, as $s : s-\frac{1}{2}$; whence, *Spheres* being as the Cube-Roots of *ſimilar* Dimenſions, we have, as $s^{\frac{1}{3}} : \overline{s-\frac{1}{2}}|^{\frac{1}{3}}$ :: the outſide Diameter of the Sphere : the Diameter of the *Vacuity*; and conſequently, by Diviſion, *&c.* $s^{\frac{1}{3}} - \overline{s-\frac{1}{2}}|^{\frac{1}{3}} : s^{\frac{1}{3}}$ :: twice the *Thickneſs* of the Metal : *outſide* Diameter of the Sphere = 31.80 *&c.* Inches, when $s = 9.00$, or the *Metal*, Copper.

Mr. *Robinſon*'s Anſwer, the Propoſer. —— *A Copper concave Sphere.* Put $c = 0.3171653$, $d = 0.036169$, the Weights of a cubic Inch of Copper and Rain-Water, reſpectively, $b =$ 3-10ths, $x =$ the inſide Diameter, $x+2b =$ the outſide Diameter, $p = .5236$. Th. $p\times\overline{x+2b}|^{3} =$ the Sphere's Solidity, $p\times\frac{\overline{x+2b}|^{3}}{2}$ ſolid Inches to be immerſed, or Water to be removed; $pd + \frac{\overline{x+2b}|^{3}}{2} =$ the Weight of the Copper or Water to be diſplaced; $pd + \frac{\overline{x+2b}|^{3}}{2c} =$ cubic Inches of Copper in the Sphere. Th. $bp\times\overline{x+2b}|^{2} =$ the ſquare Inches in the Sphere's Surface. Therefore, $pd$ multiplied by $\frac{\overline{x+2b}|^{3}}{2c}\Big)6p\times\frac{\overline{x+2b}|^{2}}{1}\Big(=\frac{12c}{d\times\overline{x+2b}} = b.\Big)$ Th. $x = \frac{12c - 2b^{2}d}{db}$ = 34.807 Inches, the inſide Diameter, and 35.407 Inches = the outſide.

Mr. *Rowe* ſays that the Kind of Metal ought to have been given; who, ſuppoſing it to be caſt Braſs, finds $x$, the inſide Diameter, = 28 Inches nearly.

Mr. *Harriſon* makes the inſide Diameter = 29.4 Inches, and 30 Inches the outſide Diameter, by a ſhort Proceſs. Mr. *Lamb*, by a ſhort Proceſs, finds 31.54485 Inches, the Sphere's Diameter, ſuppoſing it to be Copper. Mr. *Hayes* finds the Sphere's outſide Diameter (ſuppoſing it to be Copper) 31.2 Inches; but if caſt Iron, then the outſide Diameter = 24.59. Mr. *Wm Wilſon* gives a Proceſs but no Numbers; Mr. *Draper* the ſame. Mr. *Hardy* gives the Sphere's Diameter (ſuppoſing it Copper) 32.4 Inches, as deduced by Mr. *Judſon*, of *Beverly*; but gives it, from his own Deduction, by a ſhort Proceſs, = 31.79144, (the Rain-Water to Copper being as 1 to 9,) nearly agreeing with Mr. *Coughron*'s Anſwer, whoſe Solutions are claſſical. Mr. *Fininley*, in his Manuſcript Book of Solutions, (ſuppoſing the Metal *Braſs*,) finds the Diameter of the Sphere to be 28 Inches nearly, by a Proceſs ſimilar to Mr. *Coughron*'s.

### XIV. QUESTION 485, *anſwered by the* Palladium-Author, *jun.*

THE $\frac{1}{777600000}$ Part of 1 Minute of a Degree = 1 vi. of a Degree.

Log. Tang^ts.

Log. Tang. of 1′ = 6.4637261293 (*ſee p.* 54. *Pal.* 1773.)

Sub. Log. of Numb. 777600000 = 8.8907563

Nat. Tan. .003740846, of 1 vi. 3.5729698 = Log. Tan. 1 vi. = Log. $\frac{1}{777600000}$ Part of 1′.

*** Of all our ingenious and numerous Correſpondents, not one of them ſo much as attempted a Solution to this *eaſy Queſtion*; which was propoſed to ſhew what was with Reaſon apprehended, that the Uſe of *Logarithms* is not yet in ſo many Hands as might be expected.

### XV. QUESTION 486, *anſwered by Mr.* George Coughron.

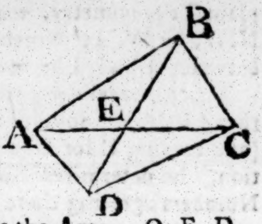
THE Numbers of *different* Ways that $n$ (5) Things, with two Faces each, can come up, in one Trial, is $= 2^n$; and therefore the *Probability*, that not one of any Number $m$ (2) particular Ways, (*viz.* all Heads or all Tails,) of theſe coming up in one Trial, will be $\frac{2^n - m}{2^n}$; and, conſequently, that not 1 of theſe will happen in $r$ (5) Trials $= \frac{\overline{2^n - m}\,|^r}{2^n} = \frac{\overline{2^n - m}\,|^r}{2^{nr}} =$ (in the preſent Caſe) $\frac{2^5 - 2}{2^{25}} = \overline{\frac{15}{16}}\,\Big|^5 = \frac{759375}{1048576} =$ the *Probability*, that the 5 Guineas ſhall not come up all Heads or Tails in 5 Trials; and therefore that of the contrary $= 1 - \frac{759375}{1048576} = \frac{289201}{1048576}$; whence the former Probability is to the latter, as 759375 to 289201, (being as 2.6257689 &c. to 1,) and the Value of A's Expectation of the *Stake* (£.115.5) is $\frac{759375}{1048576} \times 115.5 =$ £. 83 6447, &c. which taken from the *Sum* he ſtaked, 105*l.* leaves 21*l.* 7*s.* 1*d.* ½, for his *Diſadvantage*, or B's *Advantage*. W. W. R.

Mr. *Johnſon*, the Propoſer, anſwered it by a *ſhort* and *accurate Method*, in the ſame Numbers, *correctly*. ——All the Reſt of our Correſpondents Anſwers to this *Queſtion* are imperfect and wide of Truth.

### XVI. QUESTION 487, *anſwered by Mr.* George Coughron.

CONSTRUCTION. Take AC, the greater *Diagonal* (40), which divide at E, in the given *Ratio* of the Parts into which the leſſer *Diagonal* divides the

*Area,* (2 to 3); through E draw BED = the leſſer Diagonal (30), ſo as to be divided in E in the *Ratio* of the Parts into which the *greater* Diagonal divides the *Area,* (1 to 3,) and to make the Angle BEC = the given one, (76°); join the Points, A, B, C, D, and ABCD will be the *Trapezium* required. For, the △s, BAD, BCD, ABC, ADC, having reſpectively the ſame Baſes, BD, AC, are as their *Heights*; and theſe again, as EA, EC, EB, ED, which, by *Conſtruction,* are as the reſpective Parts, into which the leſſer and greater Diagonals divide the Area. Q. E. D.



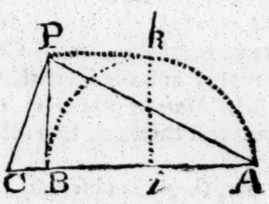
*Calculation.* By *Rule* 2, *P.* 69, of Mr. *Hutton*'s *Menſuration,* the Area is $= \frac{1}{2}AC \times BD \times \text{Sine} \angle E = 20 \times 30 \times \text{S.} \angle 76^\circ = 582.17742$ Chains = 58 A. 0 R. 34.8387 &c. Perches. —— And ſince, in each of the △s, AEB, BEC, CED, DEA, two Sides and the contained ∠ are given, the *other Side* of each, or the Sides of the *Trapezium,* may therefore be *eaſily* found, when it is known whether AE or EC, BE or ED, is to be the greateſt.

SCHOLIUM, *which ought to have been before the Calculation.* —— The *Diagonals* divide each other, *reciprocally,* as they divide the *Area.*

Mr. *Harriſon* anſwered this *Queſtion* by a Proceſs and Calculation, making the *Area* 58 A. 0 R. 34.4387 Perches. Mr. *Ward,* by a *Proceſs* and *Calculation,* makes the Area 58 A. 0 R. 35 P. nearly, confirming one another. Mr. *Finirley,* by a *Proceſs* and *Calculation,* makes the Area = 58.875 A. Mr. *Wm Wilſon,* by a *Proceſs* and *Calculation,* makes the Area = 57 A. 1 R. 27 P. Mr. *Robinſon,* by a conciſe and correct *Proceſs* and *Calculation,* makes the Area = 58 A. 0 R. 34.880 P. confirming the Truth of Meſſrs *Harriſon*'s and *Ward*'s Solutions. Mr. *Nicholſon* gives a true *Proceſs.* Mr. *Hayes,* by a *Conſtruction* and *Calculation,* finds the Area = 58 A. 0 R. 35 P. agreeing with Meſſrs *Harriſon*'s, *Ward*'s, and *Robinſon*'s, Anſwers; ſhewing the Neceſſity of giving Numbers to Proceſſes, for making *Compariſon* and determining Truth by *Agreement.* Mr. *Lamb,* by a correct *Proceſs* and near *Calculation,* finds the Area = 58 A. 0 R. 33.8784 &c. P. Mr. *J. Turner* and Mr. *Fiſher,* Pupils to Mr. *John Hart,* anſwered it. Mr. *Rowe* finds (by an eaſy *Proceſs* and *Calculation)* the *Trapezium*'s Area = 58 A. 0 R. 34.83872 &c. P.

XVII. QUESTION 488, *anſwered by Mr.* Thomas Robinſon, *of* Biddick.

FIRST, $PB = \frac{1}{2}AB$; put $b = 210$; $p$ and $q$ = Sine and Coſ. of 80°; $u = PB$; $2u = AB$; $x$ and $y$ = Sine & Coſ. ∠A; Rad. = 1. Then, by Trigonometry, we have, as $x : u :: y : 2u$. Th. $2x = y$, and $qx + 2px = \text{S.} \angle C$. As $2x : 2u :: 1 : \frac{u}{x} = AP$; and, as $qx + 2px : u :: 1 :$



$$\frac{u}{qx + 2px} = PC. \text{ Th. } \frac{u}{qx + 2px} + \frac{u}{x} = b. \text{ Hence, } u = \frac{b \times \overline{qx + 2px}}{1 + q + 2p}$$

$$= PB. \text{ Then } AP = \frac{u}{x} = \frac{b \times \overline{q + 2p}}{1 + q + 2p} = 163\ 7 \text{ Leagues, and } CP = 76.3$$

Leagues. Hence, PB = 73.2099; AB = 146.4198; CB = 21.494. *Likewiſe,* the ∠A = 26° 33′ 54″ 12‴, the Coſine of the *Courſe* of the Ship from A.

Mr. *Lamb* gives his *analytical* and *numerical* Solution, but differs from Mr. *Robinſon.* He makes the *Diſtance* from A and C ſailed to P = 181 and 59 Leagues reſpectively; and putting the *Diſtance,* ſailed by B, a *mean* Proportional between A and C, the B's Diſtance $= 103+$. The *Reſt* he finds by plain Trigonometry, *viz.* A ſails a Courſe W.N.W. 3° 41′ Weſterly; B ſails N.W. by W. 43′ Northerly; C ſails North 8° 48′ Eaſterly. The Diſtance between A and B he makes 86.46 Leagues; between B and C, 93.94 Leagues.

Mr. *Rowe* tells us, that this *Queſtion* is not *limited*; and therefore aſſumes the $\angle$PCA $= 20°$, or its Complement 70°, and ſo proceeds, by various Steps, (and reading C for B in the 6th Line of the Queſtion, not the Propoſer's Queſtion,) he determines Nothing to be compared; and without Compariſon of Numbers agreeing there is no Certainty in *Proceſſes*.

### XVIII. Question 489, *anſwered by Mr.* Thomas Robinſon.

$\frac{105}{100\times\frac{3.14159}{180}} = 60°\ 13'\ 48'' = \angle$ at the Center. By Trigonometry, the *Sine* of the Arch $= 50.173 = c$; Coſine $= 86.502 = b$; verſed Sine $= 13.498 = m$; Radius $= 100$. Put $x =$ the *Diſtance* from the Extremity of the Arch, on the Chord, (being Part of the *Sine,*) to the Side of the *inſcribed* Parallelogram in the Sector; $c-x =$ the remaining Diſtance to the End of the Sine, (or remaining Part of the Sine.) Let $y$ the Diſtance between the Middle of the Side of the inſcribed Parallelogram (next the Arch) and the Arch; then $m-y =$ the Diff. between the verſed Sine and that Diſt. or the Diſtance between the Middle of the Chord and End of the verſed Sine next the Chord. Then, by the Circle's Property, $2dy-y^2 = \overline{c-x}|^2$. Th. $y^2-2dy = 2cx-x^2-c^2$, $(d^2-c^2 = n.)$ Then, $y = d+\sqrt{2cx-x^2+n}$; $m-y = \sqrt{2cx-x^2+n} : -b$; by ſimilar $\triangle$s. $c : b :: x : \frac{bx}{c} =$ the Diſtance from the $\angle$ of the *inſcribed Parallelogram*, next the Sector's Center, to the Chord of the Arch. Hence, $\overline{\frac{bx-bc}{c}+\sqrt{2cx-x^2+n}}\times\overline{c-x} =$ the Area of the *required Rectangle*, which is to be a *Maximum*. Put into Fluxions and reduced, the longeſt Side of the inſcribed Rectangle (parallel to a Line drawn from the Circle's Center to the Middle of the Sector) will be found $= 53.551$, and the ſhorteſt, or Breadth, $= 25.084$. W. W. R.

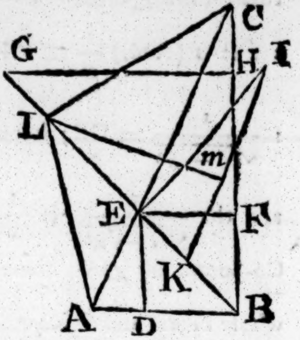
Mr. *Fininley* has given a very elaborate Proceſs without a numerical Concluſion, and therefore to no Purpoſe, as not to be relied on without a *comparative Proof.*

Mr. *Coughron* obſerves, that, as this *Queſtion* only propoſes to inſcribe the *Rectangle* of the *greateſt Area* in a *Sector*, it will be a good Exerciſe for Learners of *Fluxions*, when they engage with the *Maxima* and *Minima* of Quantities.

Mr. *Stephen Hartley* finds (by the Arithmetic of *Fluxions*) the *longeſt Side* of the Rectangle $= 53.938$, very near Mr. *Robinſon*'s Number; whence the other or *ſhorteſt Side* will be near 25.084, as found by Mr. *Robinſon*.

Mr. *Muſcroft* determines the Sides of the Rectangles (by *fluxional Arithmetic*) $51.774 =$ the Breadth, and 51.912 the Length. Mr. *Rowe* makes the Breadth 48.16, and Length 56, as near Numbers. Mr. *Wm Wilſon* gives a Proceſs, without Numbers to prove it. Mr. *Hayes* finds, by *fluxional Arithmetic*, one of the Sides $= 50.12$, and the Area of the Rectangle $= 2897$. Mr. *Hardy* makes the Sides 51.89932 and 51.773591. Mr. *Robert Arnold*, junior, finds the Sides of the *greateſt* inſcribed Parallelogram 51.912 and 51.774; ſhewing the Uſe of *Compariſon*.

**XIX.** QUESTION 490, *anſwered by Mr.* George Coughron,



**CONSTRUCTION.** Produce the Diagonal, BE, of the given Square, BDEF, till BG = the given Hypothenuſe; draw GH || BD, and EI perpendicular to BE = GH; alſo IK to the Center of BE; and take KL = KI; from L, with the Radius GH, interſect BC in C; draw CEA; and ABC will be the △ required.

*Demonſtration.* Let L*m* be perpendicular to KI; then, the right-angled △s, KEI, K*m*L, having equal *Hypothenuſes (per Conſtruction)* and the ∠H common, muſt be equal in every Reſpect; and, of Courſe, KE = K*m*; and L*m* a Tangent to a Circle inſcribed from K through E*m*B; whence, (*Eucl.* 3. 36.) $BL \times EL = Lm^2 = LC^2$, and *therefore*, BL : LC :: LC : LE; conſequently, the △s LCB, LCE, are ſimilar, (*Eucl.* 6. 6.) and therefore, ∠LCE = ∠LBC = ∠LBA; whence the Circumference of the Circle may be deſcribed through all the 4 Points, C, B, A, L, (*Eucl.* 3. 21.) hence the ∠s CAL, CBL, (= BGH,) ſtanding upon the ſame *Subtenſe*, CL, muſt be equal, and therefore ∠CAL = ∠LCA; and, conſequently, the △ ALC is *Iſoſceles*, and ſimilar to BHG; but LC = GH, (*per Conſtruction,*) whence AC muſt be equal to BG. Q. E. D.

*Calculation.* In the right-angled △ BHG, are given the Hypothenuſe and ∠GBH = 45°, to find GH = EI; and, in the right-angled △ KEI, are given the Legs, KE, EI, to find the Hypothenuſe KI = KL; alſo, in the △BLC are given BL, LC, and ∠B, to find BC; from whence ∠ACB may be found; and thence, AB, BC. —— All theſe *Calculations* may be made by Trigonometry, without *extracting Roots.* W. W. R. But GH ($= BG\sqrt{\tfrac{1}{2}}$) and HI ($= \sqrt{KE^2 + EI^2} = \sqrt{KE^2 + GH^2} = \sqrt{\tfrac{1}{2}BD^2 + \tfrac{1}{2}BG^2}$) may be taken more eaſily by the *ſquare Root.* W. W. R.

I could have given the *Conſtruction* and *Demonſtration* in far fewer Words, if, inſtead of ſhewing how to find the Point L, I had ſaid, — Upon BE, produced, take L ſo, that, BL : GH :: GH : EL. —— But there would be Nothing gained by this; and, beſides, the *Calculation* (the Thing required) appears more clearly from the above.

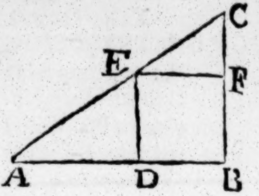
As this *Queſtion* was propoſed *general*, without Numbers, Mr. *Coughron* has given a general and ſatisfying Anſwer.

Mr. *Fininley* has given a very good Solution, (with an *Example,*) but not without the *Extraction* of Roots.

Mr. *Stephen Hartley* anſwers this *Queſtion* as follows. —— Make the *Hypothenuſe* of the given right-angled △ the Diameter of a Circle, and the other Sides to meet in the *Periphery*; draw the Perpendicular BH, and put DE $= a$, AC $= b$, and BO $= x$. Then, by ſimilar △s, $x : a :: a + x : b$. *Therefore,* $x = \frac{a^2}{b - a}$, whence OH, (the Difference between BO and the Perpendicular,) the Side of the inſcribed *Square* is had without Extraction of Roots.

Mr. *Rowe* ſolves the ſame by a ſimple *Quadratic*, and leaves it to the Propoſer (he ſays) to give a *more ſimple Solution.* —— Mr. *Robinſon* finds the *Side of a Square*, but not without Extraction.

The Propoſer, Mr. *Johnſon*, gives this *Solution.* —— Put $b =$ AC, the Hypothenuſe; and $s =$ DE = EF, the Side of the Square; $x =$ the nat. Sine ∠A; then,



then, ſince $\angle C = \sqrt{1 - x^2}$, *per* Trigonometry, $x : s :: 1$ (Rad.) $\frac{s}{x} = AE$, and $\sqrt{1 - x^2} : s :: 1 : \frac{s}{\sqrt{1 - x^2}} = CE$; hence, $\frac{s}{\sqrt{1 - x^2}} + \frac{s}{x} = b$; and th. $\frac{1}{\sqrt{1 - x^2}} + \frac{1}{x} = \frac{b}{s}$. But $\frac{1}{\sqrt{1 - x^2}} =$ nat. *Secant*, and $\frac{1}{x} =$ Co-Secant of $\angle A$; therefore, we need but find, in the Tables, an Angle, whoſe *Secant* and *Coſecant*, when added together, ſhall be $= \frac{b}{s}$. Thus, ſuppoſe $b = 36$, and $s = 12$, then $\frac{b}{s} = 3$; and, looking in the Tables of nat. Secants, I find $\angle A = 56^\circ\ 10'$; when the Reſt are eaſily found by *Trigonometry.* W. W. R.

XX. Question 491, *anſwered by Mr.* George Coughron.

DIVIDE the Semidiameter of a given *Circle* into 7 equal Parts; and, at the End of the Diameter, next to the Radius, divided into 7 equal Parts, raiſe a Perpendicular thereto, equal to 3 Times the *Radius* and 1 of thoſe Parts into which it is divided; *join* the Extremity of the Perpendicular and the *contrary* End of the Circle's Diameter, and the Space, contained by the *Diameter*, *Perpendicular*, and *Hypothenuſe*, will be that of a right-angled Triangle, equal to the Area of the ſaid Circle.

This *Solution* is evidently founded on the *Ratio* of the Diameter to the Circumference, as 1 to 3 1-7th, or as 7 to 22; and gives .7857 *&c.* for the Area, when the Diameter of the Circle is *Unity*; which is only .0003 ($= \frac{3}{10000}$) $= \frac{1}{3333}$ Part too much; and therefore but 1 too much in 3333.
[W. W. R.

Mr. *Fininley*'s Anſwer. —— Let the Diameter of a *Circle* given be divided into 14 *equal* Parts, (and conſequently the *Radius* into 7;) and, at 11 (or 3) of thoſe Parts, raiſe a Perpendicular to the Circle's Periphery; then, from the *Interſection* of that Perp. and Periphery, draw a *Line* to the End of the Circle's Diameter, where 11 Parts were reckoned from; and it will be the Side of a *Square* equal to the *Area* of the Circle given, *very nearly*. W. W. R.

Capt. *Williams*'s Anſwer, of *Woolwich*, the Propoſer. —— Draw the Diameters of any *Circle* at right Angles to each Other, and *produce* them, each Way, beyond the Circle, till the produced Part of each Diameter is equal to *one-fourth* of the *Radius*; ſo will the 4 *Points*, when *conjoined*, (by ſtrait Lines drawn between them,) form a *Square* nearly equal to the *Area* of the Circle.

*Demonſtration.* If the Diameter of the *Circle* $= 1$, its *Area* $= .785398$ *&c.* by a known *Proof.* Alſo the *Diagonal* of the Square $= 1 + \frac{1}{4} = \frac{5}{4}$, by Conſtruction. Therefore the Area $= \frac{5}{4} \times \frac{.5}{8} = .78125$; and the Circle (.785398 *&c.*) exceeds the Square only by .004148 Parts of the whole Circle; [*viz. by* $\frac{4148}{1000000}$ *Parts* $= \frac{1}{241}$ *Parts of the Whole*;] and conſequently this *Conſtruction* is ſufficiently accurate for any mechanical Purpoſe. Q. E. D.

Mr. *Emerſon*, in his *Weights and Meaſures*, gives ſeveral eaſy and mechanical Solutions to this *Queſtion*, not to be exceeded by any.

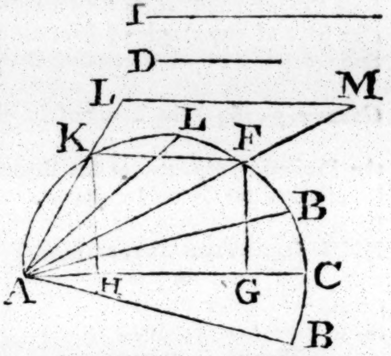
### GENERAL RULE *for conſtructing a* SQUARE *as near a* CIRCLE *as poſſible.*

### *By the* PALLADIUM-AUTHOR.

Let the *Radius* of the *given Circle* be always divided into 10 *equal* Parts; and, if the Circle is large, let each of thoſe *Parts* be divided into 10 *Others*, *&c.* then add .2533, or the *neareſt* you can of thoſe Parts, to each End of the 4 *Radiuſes*, when the Diameters are drawn perpendicular to each other; and *join* thoſe Points by ſtrait Lines drawn between them, and you will have a *Square* the *neareſt* to a given Circle that *can be mechanically drawn.*—Or you may divide the Radius of a Circle into the utmoſt decimal Parts, by a *Sector*, and take the Extent of it by the *Dividers*, ſo as to anſwer the neareſt to .2533, according to each of the 4 Extremities of the *Radius*, drawn as aforeſaid, finally joining them.

Mr. *Rowe* has given a *Conſtruction* ſimilar to Mr. *Fininley*'s, by taking a geometrical Mean between the Circle's Diameter and $\frac{1}{4}$ of its Periphery, for the Side of a *Square* equal, in Area, to the Circle's Area.

### XXI QUESTION 492, *anſwered by Mr.* George Coughron.

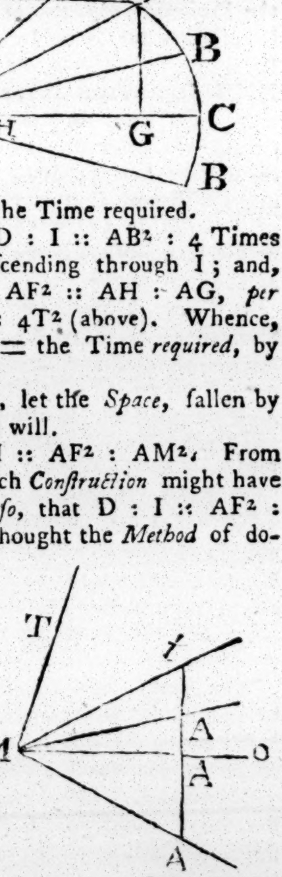


CONSTRUCTION. Let I repreſent the given *Impetus*, AE the Direction of the Piece, AB the inclined Plane, AC the Level of the Piece, and AB twice the Time (1 Second) that a heavy Body is in deſcending through any given Diſtance D (16 Feet). Through the Points, A, B, deſcribe a Circle, ABC, to have its Center in AC; make the $\angle CAF =$ Comp. $\angle BAE$, and let fall upon AC the Perp. FG; take AH ſo, that $I : D :: AG : AH$; and erect HK perp. to AC; produce AK till $AL = AF$; draw $LM \parallel KF$, meeting AF produced in M; and AM will repreſent the Time required.

*Demonſtration.* By the Laws of falling Bodies, $D : I :: AB^2 : 4$ Times the Square of the Time (T) of a heavy Body in deſcending through I; and, by ſimilar $\Delta$s, (AL,) $AF^2 : AM^2$ $(:: AK^2 : AF^2 :: AH : AG$, *per* Prop. Circ.) $:: D : I$ (*per* Conſtruction) $:: AB^2 : 4T^2$ (above). Whence, (AB) Coſ. $\angle CAB$ : (AF) S. $BAE :: 2T : AM =$ the Time *required*, by *Cor.* 1. *P.* 196. *Simpſon's Select Exerciſes.* Q. E. D.

*Scholium.* The *geometrical* Conſtruction is general, let the *Space*, fallen by heavy Bodies in the *firſt* Second of Time, be what it will.

It appears, from the *Demonſtration*, that $D : I :: AF^2 : AM^2$. From whence the *Calculation* is very eaſy. And from which *Conſtruction* might have been given in *fewer Words*, by ſaying, *Find* AM *ſo*, that $D : I :: AF^2 : AM^2$, and AM will be the Time *required.* But I thought the *Method* of doing this would not be unneceſſary. G. COUGHRON.



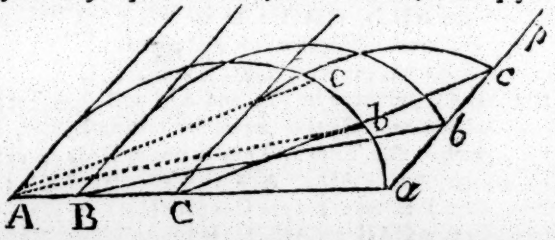
The Propoſer, Capt. *Williams*'s Anſwer. —— *Conſtruction.* Let ME be the given Direction of the *Piece*, and MA the given Plane. Draw MT making Half Right-Angle with M*t*; on which take MT = *Time of Flight* for the greateſt horizontal Range, with the given *Impetus*; and on the Center T, with the Radius TM, interſect M*t* in *t*; from whence let fall a Perpendicular on the horizontal Line MO; ſo will *t*A = the *Time of Flight* on the Plane MA.

*Demonſtration.* Put the *Impetus* = I Yards, Time of *Flight* for the greateſt horizontal *Range* (with the *Impetus* I) = F Seconds, $\frac{1}{4}\sqrt{61}$ Sine of Elevation above the Plane, *viz.* ADIT = P; the Coſine of Inclination. AMO, = $c$; and the Time of Flight on the Plane, MA, = $f$ *Seconds.* Then, by the Doctrine of *Projectiles,* will $f = \frac{FP}{C}\sqrt{2}$; whence this Analogy, C : P :: F $\sqrt{2}$ : $f$. Now, in the above *Conſtruction,* MT = F; and therefore M$t$ = F $\sqrt{2}$; and the Reſt of the *Analogy* is founded in the △MAT, theref. &c.

*Obſervation.* The ingenious Author has *remarked* to us, in one Part of his Letter, that the above *Queſtion* admits of an *elegant* geometrical Conſtruction, by the *Artifice* of rejecting 1-12th from 16 1-12th Feet, which Bodies are found to fall in the 1ſt Second of Time, by Experiment; the 1-12th rejected being no *Error in Practice.*

Mr. *Rowe* puts $a$ = the *Impetus,* or Height of the perpendiculur Projection; $b$ = Coſ. of the Plane's Elevation or Depreſſion above or below the Horizon; $c$ = Sine of the Angle of Elevation or Depreſſion of the *Piece*; then $d$ = the Space deſcribed by a deſcending Body in 1 *Second* of Time. Then, (by *Holliday*'s *Gunnery, p.* 164,) the Time of *Flight* will be $= \frac{2c}{b}\sqrt{\frac{a}{d}}$ $(= \frac{ce}{bd}$; $e$ being the *Projectile's Velocity,* at the Beginning of its *Flight,* meaſured by the Space it deſcribes *per Second) required.*

XXII. QUESTION 493, *anſwered by Capt.* Williams, of Woolwich, *the Propoſer.*



1. LET there be *prepared,* with great *Accuracy,* a *Mortar,* a *ſolid Shot,* and a ſufficient Quantity of *Powder,* in Order to preſerve an *uniform* Force as nearly as *poſſible.*

2. Chuſe a *convenient* Situation, A$ap$, where A$a$ is a *horizontal* Plane, and $ap$ the Side of a *Hill* or *Mountain.* Then, at the *ſeveral* Stations, A, B, C, &c. let *ſeveral Projections* be made, with *every Circumſtance* the ſame, ſtriking the *Hill* in the Points, $a$, $b$, $c$, &c. reſpectively; and let the Angles, $a$B$b$, $a$C$c$, &c. and B$ba$, C$ca$, &c. be *obſerved,* with the Diſtances of the *Stations,* they will determine the *Amplitudes,* B$b$, C$c$, &c.

3. Draw, through A, *Parallels* to the ſeveral *Amplitudes*; and, on each Parallel, ſet off its reſpective Amplitude, *viz.* A$b'$, A$c'$, C$c'$, &c. which will determine ſo many *Points* in the *required Curve*; and, if another Series of *ſimilar* Experiments be made upon the *Deſcent,* the Part of the *Curve,* below the Horizon, may in like Manner be determined.

4. The *Vertex* of the Curve muſt be determined by obſerving the *greateſt* Angle of Altitude of the Shot, &c.

The Angle, at which the *Projection* ſtrikes the Ground, may be determined by cauſing the Shot to paſs through a Stage of a ſufficient Height, or by making it fall into a *Pit of Clay,* or by *both*; which, by the by, might alſo, in ſome Meaſure, aſcertain the *Velocity* of the Shot at its entering the Clay.

*Obſervation.* The *Note,* from *Emerſon*'s *Fluxions,* (*Cor.* 4. *Prop.* 19.) at the Bottom of this *Queſtion,* (*P.* 71. *Pal.* 1773,) belongs to the former *Queſtion,* miſtranſcribed.

**Remark.** Theſe Kinds of Experiments are certainly very neceſſary to be made, for improving the *important Art of Artillery*. **Palladium-Author.**

XXIII. Question 494, *anſwered by Capt.* Williams, *the Propoſer.*

$$\text{PUT}\left\{\begin{matrix}\text{Sine}\\ \text{Coſine}\end{matrix}\right\}\begin{matrix}\text{Time of the 3d}\\ \text{Obſerv}^{\text{n}}\text{ fr. Noon}\end{matrix}\left\{\begin{matrix}x\ \text{Sine}\\ y\ \text{Coſ.}\end{matrix}\right\}\begin{matrix}\text{Time betw.}\\ \text{1ſt \& 3d Obſ.}\end{matrix}\left\{\begin{matrix}S\\ C\end{matrix}\right\}\begin{matrix}\text{and bet.}\\ \text{2d \& 3d}\end{matrix}\left\}\begin{matrix}s\\ c\end{matrix}\right.$$

$$\begin{matrix}\text{Alſo}\\ \text{put}\\ \text{Sine}\end{matrix}\left\}\begin{matrix}\text{1ſt}\\ \text{2d}\\ \text{3d}\end{matrix}\right\}\text{Altitude}\left\}\begin{matrix}\textsc{a}\\ a\\ A\end{matrix}\right\}\begin{matrix}\text{and}\\ \text{let}\end{matrix}\left\{\begin{matrix}\text{Sine}\\ \text{Coſ.}\end{matrix}\right.\text{Latitude}\left.\begin{matrix}z\\ v\end{matrix}\right\}\text{and Declin.}\left\{\begin{matrix}m\\ n\end{matrix}\right\}$$

$$\begin{matrix}\text{Then}\\ \text{will}\end{matrix}\left\{\begin{aligned}&vnCy-vnSx+mz=\textsc{a}\\ &vncy-vnsx+mz=a\\ &vny+mz=A\end{aligned}\right\}$$

From which 3 Equations, properly reduced, there will reſult $\frac{x}{y}=\frac{DQ-dq}{ds-DS}=$ Tan. of the *Hour*-∠ from *Noon* at the 3d Obſervation.

From whence, the *Latitude* is found by ſolving a *Caſe* in oblique ſpherical Triangles. In which *Theorem*, $D=A-a$; $d=A-\textsc{a}$.

$$\left.\begin{matrix}Q=1-C\\ q=1-c\end{matrix}\right\}=\text{the } \textit{verſed Sines} \text{ of the above Times.}$$

*N. B.* From this *Theorem*, a Set of *Tables* may eaſily be made to determine the *Latitude* in a conciſer Method than any other I have yet met with. **W.W.R.**

Obſervation. *What will then become of thoſe Tables by* Cornelis Dowes, *of* Amſterdam, *copied by Mr.* Maſkelyne, *with a few Additions, from* Mount *and* Page's *Books, into the* Nautical Ephemeris, *requiring a tedious Operation to little Purpoſe?* Palladium-Author.

*Mr.* Coughron's *Anſwer, with his Inveſtigation of the Propoſer's Theorem for ſolving it.*

$$\begin{matrix}\text{Put Sine}\\ \text{Coſ.}\end{matrix}\left\}\begin{matrix}\text{Time of 3d}\\ \text{Obſ.fr.Noon}\end{matrix}\right\{\begin{matrix}x\ \text{Sine}\\ y\ \text{Coſ.}\end{matrix}\left\}\begin{matrix}\text{Time betw.}\\ \text{1ſt\&3d Obſ.}\end{matrix}\right\{\begin{matrix}S\ \text{Sine}\\ C\ \text{Coſ.}\end{matrix}\left\}\begin{matrix}\text{Time betw.}\\ \text{2d \& 3d Obſ.}\end{matrix}\right\{\begin{matrix}s\\ c\end{matrix}$$

$$\text{Sines}\begin{matrix}\text{1ſt}\\ \text{2d}\\ \text{3d}\end{matrix}\left\}\text{Alt}^{\text{s}}.\right\{\begin{matrix}\textsc{a}\\ a\\ A\end{matrix}\left\}\begin{matrix}\text{reſpect-}\\ \text{ively.}\end{matrix}\right.\quad\begin{matrix}\text{Sine}\\ \text{Coſ.}\end{matrix}\text{Declin.}\left\}\begin{matrix}m\ \text{Sine}\\ n\ \text{Coſ.}\end{matrix}\right.\text{Latitude}\left\{\begin{matrix}z\\ s\end{matrix}\right.$$

(retaining the *Propoſer's Subſtitution.*)

$$\text{Then will}\left.\begin{matrix}Cy\pm Sx\\ cy\pm sx\end{matrix}\right\}\begin{matrix}\text{Coſines of the Times from Noon}\\ \text{at the firſt and 2d Obſervations.}\end{matrix}$$

Therefore, (by *P.* 211, *Emerſon's Trigonometry, 2d Edit.*)

$$\left\{\begin{aligned}&vn\times\overline{Cy\pm Sx}+mz=\textsc{a}\\ &vn\times cy\pm sx+mz=a\\ &vny+mz=A\end{aligned}\right\}$$

By taking the 1ſt and 2d of theſe from the third, we have $vn\times\overline{\overline{1-C}\times\overline{y\mp Sx}}=A-\textsc{a}$; and $vn\times\overline{\overline{1-c}\times y\mp sx}=A-a$; and, by multiplying theſe Croſs-ways, (*viz.* the former Part of one into the latter Part of the Other,) we have $\overline{A-\textsc{a}}\times\overline{\overline{1-c}\times\overline{y\mp sx}}=\overline{A-a}\times\overline{\overline{1-C}\times\overline{y\mp Sx}}$; from whence $\frac{x}{y}=\pm\frac{\overline{A-a}\times\overline{1-C}-\overline{A-\textsc{a}}\times\overline{1-c}}{\overline{A-\textsc{a}}\times s-\overline{A-a}\times S}=\mp\frac{Dq-dq}{DS-ds}=$ the Tangent of the Hour-Angle from Noon at the 3d *Obſervation*. And, when $D=A-a$, $d=A-\textsc{a}$, $Q=1-C$, and $q=1-c$, $=$ verſed Sines of the Times between the 1ſt and 3d, and 1ſt and 2d, Obſervations, *reſpectively*, and that one of the *double* Sines muſt be taken, which renders the Value of $\frac{x}{y}$ affirmative.

Now, if the *Declination* be ſuppoſed given, (which at Sea is generally known pretty near,) the Latitude may from hence be determined by the Solution of a *Caſe* in oblique Spherics; but, in Caſe the *Declination* be unknown, the *Latitude* may be determined thus.

Since $\frac{x}{y}$ is known, $x$, $y$, and $vn$, will all be known; the latter of which, $vn$, put $= p$; then, from the Equation, $vny + mz = A$, we find $\overline{A-py}\vert^{2} = m^2z^2 = \overline{1-n^2} \times \overline{1-v^2} = 1-n^2-v^2+p^2$; hence $n^2+v^2 = 1+p^2-\overline{A-py}\vert^{2}$, which call $r$; ſo ſhall we have $n^2 \pm 2nv + v^2 = r \pm 2p$, and therefore $n \overset{+}{\backsim} v = \sqrt{r \pm 2p}$, and $n$ and $v = \frac{1}{2}\sqrt{r+2p} \pm \frac{1}{2}\sqrt{r-2p}$; the upper Sign giving the Value of the greater, and the lower of the leſſer. W.W.R.

Query. Can a *Navigator* reduce all this curious and elaborate *Theory* to real *Practice* at Sea? Palladium-Author.

Mr. *Harriſon* has given a very *curious* and *uncommon Solution* by the *Tangent*, (or Sine divided by the Coſine,) from *Emerſon*'s *Algebra*, *p.* 448, *where this Queſtion is propoſed and ſolved in an elegant Manner*; but, as we do not think any of theſe *Solutions* reducible to *Practice* at Sea, it happens well that we are forced to omit thoſe we have not Room for.

Mr. *Rowe* gave a *practical Anſwer* (as he calls it) by the Sun's leſſer geometrical mean Altitude, taken between two adjacent Altitudes, obſerved, with the Angle from Noon, at the greater and leſſer mean Altitude, and Sun's Declination at the mean Time. But, as the true Time from Noon depends on, or is determined by, the *Latitude* in Queſtion, we cannot ſee its Utility in Practice.

Mr *Rowe* remarks, that Mr. *Hartley's Notation*, *P.* 41, *Pal.* 1771, ſhould have been like that of Mr. *Robinſon*, *P.* 42, when corrected; *viz.* for Coſ. 74° 10′, read Coſ. 15° 50′ 30″; and, for Coſ. 51° 6′, r. Coſ. 38° 54′ 45″. Then the *Colatitude* comes out from his *final* Equation = 39° 10′ 39″; and hence that Lat. = 50° 49′ 21″; then agreeing with the Other's Latitude, *P.* 41 of the ſaid *Palladium*, 1771.

### XXIV. Question 495, *anſwered by Mr.* George Coughron.

PUT $a$ and $b$ for the Length and Breadth of the *Rectangle* = 40 and 30 Yards, and $m$ and $n$ for the Height of the raiſed Earth, and the Depth of the Ditch = 1 and 2; and $x$ for *twice* the Breadth of the Ditch. Then will $\overline{a-x} \times \overline{b-x}$ and $\overline{a+b-x} \times x$ be the *Area* of the remaining *Ground* and of the *Ditch*, reſpectively, Conſequently, $m \times \overline{a-x} \times \overline{b-x} = nx \times \overline{a+b-x}$; from whence, $\frac{1}{2}x = \frac{a+b}{4} - \frac{1}{2}\sqrt{\frac{1}{4} \times \overline{a+b}\vert^{2} - \frac{abm}{m+n}} = 3.1386$ &c. Yards = the Breadth of the *Ditch*. —— *Similar* Methods of Solution will not give the *Anſwer in ſeveral Caſes*: For, in moſt irregular Figures, and *Curves*, the *Proceſs* will be very difficult; but if, inſtead of ſuppoſing the *Ditch* every where of the ſame Breadth, (as in the above *Solution*,) we ſuppoſed its Breadth to vary ſo, as that all the remaining Field may be *ſimilar* to the given one, the *Solution* will be the ſame in every Caſe; which take as follows.

Let $m$ and $n$ be as before; and S and $s$ put for any two *homologous* Sides or Parts of the given Field and the remaining one; then it is *evident*, that, $m : n$ :: *Area* of the *Ditch* : the *Area* of the *remaining Field*; and therefore, by *Compoſition*, $m+n : n$ :: the given *Field* : the remaining one :: $S^2 : s^2$. (*Euc.* vi. 20.) Conſequently, $\sqrt{m+n} : \sqrt{n} :: S : s$; and, by Diviſion, $\sqrt{m+n} : \sqrt{m+n} - \sqrt{n} :: S : S-s$ = the *Sum* of the Breadth of the

*Walk*, at the Extremities of $s$, in the *Direction* of $s$; from whence the *Breadth* of the *Ditch*, at any Point, may be eaſily found.

*Corollary*. Since, in any *regular Polygon*, the remaining Field will be *ſimilar* to the given one, when the *Ditch* is every where of the ſame Breadth, the above Proportion gives us (by ſuppoſing S = the Perpendicular from the Center of the given *Polygon* upon one of its Sides) as the Square-Root of the Sum of the Height of the raiſed Earth and the Depth of the Ditch is to the ſaid *Square-Root* leſs the Square-Root of the Depth of the Ditch, ſo is the *Perpendicular* from the *Center*, upon the Side of any *regular Polygon*, to the perpendicular *Breadth* of the Ditch. W. W. R.

Mr. *Gumley* determines the *Breadth of the Ditch* (by a ſimple Quadratic) 3.1386 &c. to a Hair. Mr. *Fininley* exactly determines the ſame Number by a *ſimilar Method*. Mr. *Rowe* alſo anſwered it. Mr. *Dalton* ſhortly anſwered it; Mr. *Stephen Hartley* in Mr. *Coughron*'s Number; Mr. *Robinſon* in the ſame Number; Mr. *Harriſon* in 3.138513. Mr. *Watchorne* anſwered it; as did Mr. *Perrot*, Mr. *Ward*, Mr. *Fatherley*, Mr. *Wm Wilſon*, Mr. *James Hartley*, Mr. *Wadforth*, Mr. *Hayes*, Mr. *Hardy*, Mr. *Shaw*, Mr. *Lamb*, and Mr. *Taylor*.

### XXV. QUESTION 496, *anſwered by Mr.* Wm Hardy, *of* Cottingham.

ASSUME a Triangle whoſe Hypothenuſe $= 1$, Perpendicular $= x$, and Baſe $= x + \frac{5}{8}$, ſimilar to that required. Then, (by 47. *e*. 1.) $\frac{64x^2 + 80x + 25}{64} + x^2 = 1$; whence, $x = 0.321811$, and Baſe $= 0.946811$; conſequently, $6 \times 0.0946811 = 5.680866$ Chains, the Baſe required; and $6 \times 0.321811 = 1.930866$, the Perpendicular required. Whence the Area $= 5.4844955$ &c. Chains.

Mr. *Stephen Hartley* finds the ſame Numbers nearly by the *ſame Method*.

Mr. *Coughron* obſerves, that to reſolve this *Queſtion* is only from the Difference of two Quantities and the Sum of their Squares (*viz.* the *Sines* of the acute Angles) to find thoſe Quantities. Mr. *Robinſon* finds the Perpendicular 1.9308 &c. by a *ſimple Quadratic*, the Baſe 5.6808 &c. and Area 5.484 &c. ſquare *Chains* = 2 R. 7¾ Poles; confirming the Truth of the foregoing Solutions. The Propoſer makes the *Area* the ſame by a ſhort and true Proceſs; (who obſerves, that the *Hypothenuſe* ſhould have been printed 16 inſtead of 6 Chains, when the Field's Area comes out 3 A. 3 R. 24 P.) Mr. *Fininley* gave the ſame Anſwer by a ſhort Proceſs. Mr. *Dalton* anſwered it; as did Mr. *Ward*, Mr. *Muſcroft*, Mr. *Wm Wilſon*, Mr. *James Hartley*, Mr. *Wadforth*, Mr. *Lamb*, Mr. *Nicholſon*, and Mr. *Hayes*, who obſerves, that the Rectangle of the Sine of the acute Angles of a right-angled Triangle, multiplied into the Square of the Hypothenuſe, is equal to twice the Area of that Triangle; a new diſcovered Property.

### XXVI. QUESTION 497, *anſwered by Mr.* George Coughron.

BY *Queſt.* $\overline{x^2}|^{4x} \times \overline{5x}|^{2x}$ = a *Minimum*, and therefore its Log. $8xX + 2x \times \overline{X + \text{hyp. Log.}\,5} = 10xX + 2x \times \text{hyp. Log.}\,5$ = a *Minimum* (where $X$ = hyp. Log. $x$); the Fluxion whereof made $= 0$, we have $10\dot{x}X + 2\dot{x} \times \text{hyp. Log.}\,5 = 0$; hence $X = -1 + \frac{\text{hyp. Log.}\,5}{5} = -1.3218876$, and therefore $x = .26663$ &c. from whence the Diameters are found = 1.1657 and .0596, and thence the *Area* = 0.055595 &c. W. W. R.

Mr. *Taylor* confirms Mr. *Cougbron*'s Solution, who makes the Value of $x$ .26666 &c. Theſe 2 are the only true Solutions to this *Qu.* we have received.

XXVII. Question 498, *anſwered by the* Palladium-Author, *jun. the Propoſer.*

IT is well known that any right-lined Figure inſcribed in a *Circle*, (being the moſt *capacious* Figure of any other under the ſame *Boundary*,) will contain the *greateſt Area* poſſible. And Mr. *Emerſon* has demonſtrated, in *Book* 4, *Prop.* 4, of his *Geometry*, that any *Trapezium*, being inſcribed in a Circle, *if each Side be ſubtracted from the Sum of the other* 3 *Sides, there will be* 4 *Remainders*; *the Product of any* 2 *of which being taken, and likewiſe the Product of the other* 2, *the mean Proportional between thoſe* 2 *Products, or the Square-Root of the Product of both thoſe Products, or of all the Remainders multiplied together, will be equal to* 4 *Times the Area of the ſaid Trapezium.*

The *Fences* given are 4, 5, 7, and 9, *Furlongs*, to encloſe the *greateſt Area.*

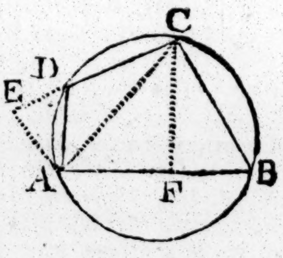
Rem^rs.

$$\left.\begin{array}{r} 5+7+9-4=17 \\ 7+9+4-5=15 \\ 9+4+5-7=11 \\ 4+5+7-9=\ 7 \end{array}\right\}$$

Hence, $17\times15\times11\times7=19635$; and $\sqrt{19635}=140.1249442461$ &c. $=4$ Times the *greateſt Area* in ſquare Furlongs; $\div 4 = 35.0312360615$ ſquare Furlongs; and $\times 10$ (the Acres in 1 ſquare Furlong) $= 350.312360615$ ſquare Acres; at 25*l.* each $=$ £. 8757.809015375 &c. $=$ 8757*l.* 16*s.* 2*d.* 0*q.* .65476. W. W. R.

*Obſervation.* Hence it appears, by the ſame Product of Remainders, that, whichſoever Way the 4 Sides are put together, they will comprehend, equally, the *greateſt Area* when inſcribed in a Circle.

Mr. *Lamb* anſwered this *Queſtion* by a Method from *Simpſon*'s *Fluxions* and *Hutton*'s *Menſuration*, amounting to the ſame as Mr. *Emerſon*'s Rule. Mr. *Robinſon* anſwered it by *literal Arithmetic*, from a Method in the *Gentleman's Diary*, 1743, deduced from *Simpſon*'s Rules, agreeing with Mr. *Hutton*'s numerical Rule. Mr. *Harriſon* anſwered it; as did Mr. *Muſcroft*, Mr. *Hill*, Mr. *Perrott*, Mr. *Eggington*, Mr. *Fatherley*, Mr. *Hardy*, Mr. *Hedley*, Mr. *Hayes*, and Mr. *Nicholſon.*



Mr. *Rowe* ſhortly deduces the true Anſwer (by inſcribing the Figure in a Circle) as follows. — Let the given *Trapezium*, ABCD, be circumſcribed by a *Circle.* Continue the Line CD, and draw the Perp. CF and AE. Then put $AD=4=a$; $DC=5=b$; $CB=7=c$; $BA=9$ Furlongs $=d$; and $ED=x$. Then, by ſimilar $\triangle$s, AED, BFC, As $a:x::c:BF=\frac{cx}{a}$. Then, $a^2+b^2+2bx$ $(=AC^2)=c^2+d^2-\frac{2cdx}{a}$. Which being reduced, it gives $x=\frac{c^2+d^2-a^2-b^2}{2ab+2cd}=2.1445783$. And thence $BF=3.7530120$; $AC=7.9023644$; $EC=7.1445783$; and $EA=3.3765046$ Furlongs. Whence the Area, ABCDA, is $=35.031236$ ſquare Furlongs. And thence the Value of the *Lady's Eſtate* is $=$ 8757*l.* 16*s.* 2*d.* 0*q.* .65 &c. W. W. R.

Mr. *Drake* made the Acres 350.312; and the Value 8757*l.* 16*s.* 1*d.* $\frac{1}{4}$.

Prize-Question, *anſwered by a* Practical Navigator, A. A. A. non F. R. S.

*A* Mechanical Method *to find the* Latitude *of the* Ship's Place *at Sea, in the Night, by a large* Cœleſtial Globe *accurately made.*

RULE. The Altitude of two Stars being taken, by different Obſervers, at the ſame Time of the Night, the Extent of each *Zenith-Diſtance* muſt be taken by the *Compaſſes* from the *Quadrant* of Altitude of a large celeſtial Globe on-board; then, ſetting one *Foot* of the Compaſſes in each reſpective Star's *Center*, you muſt turn the other *Foot* about with the reſpective Extent of each Star's Zenith-Diſtance; ſweep two Arches on the *Convex* Surface of the Globe, by Means of a black-lead Pencil fitted to the moving Point of the Compaſſes; then, the *Interſection* of theſe two *Arches* being turned to the *Braſs Meridian* of the ſaid Globe, it will, at *once*, ſhew the *Latitude* of the Place where the *Ship is*; becauſe the *Interſection* of any two *Zenith-Diſtances* of Stars is exactly at the *Zenith* of the Place of Obſervation. Whence, the *Latitude* of the *Place*, which is the Diſtance of the Zenith on the *Braſs-Meridian* from the *Equinoctial*, will be ſeen; and alſo the *Complement* of Latitude, which is the Diſtance of the *Zenith*, on the *Braſs-Meridian*, to the Pole.

OTHERWISE. —— Or, you may have two *Quadrants* of Altitude *exactly* fitted to the Braſs-Meridian, ſo as to turn upon one Center on the Braſs-Meridian, and thereon to *ſlide* freely backward or forward; which muſt be moved till the Quadrants of Altitude lie *exactly* over the two reſpective *Zenith-Diſtances* taken of the two Stars, or exactly *coincide* with thoſe *Zenith-Diſtances* on the Globe: When the *Slide*, on the Globe's *Braſs-Meridian*, will reſt at the *Latitude* of the *Ship's Place, required.*

*By* CALCULATION. —— The *Latitude* may be determined by a *trigonometrical* Operation, from the two Altitudes or Zenith-Diſtances of the two Stars, taken at the ſame Time, (their *Declinations* and *Right-Aſcenſions* being known;) the *Reſult* of which *Operation* ſhould be *compared* with the *Latitude* found from the *mechanical Method*, for adjuſting or aſcertaining the Truth. *In Mr.* Emerſon's Algebra, Prob. clix. P. 448. *the ſhort and correct Method of Solution may be ſeen.* — This *Method* will determine the Latitude by Night, coming near Land, when it is moſt wanted to be known; becauſe, in the Day-Time, (except in hazy Weather,) the Land may be generally ſeen and avoided.

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*Corrections of Pal.* 1773. — P. 31, L. 5, for *had*, r. *has*. P. 63 L. 33, for *ancient*, r. *Orient*; L. 36, for *new*, read *now*; L. 37, for *appear*, r. *appear'd*.

*Solution of Queſtion* 420, *corrected by Mr.* Pen, *of* Chalfont.

BY *Rule, P.* 38, *Pal.* 1773, the Solidity of an *infinite Number* of ſuch Globes $=yy \div y-z$ (putting $y$ for the Solidity of the 1ſt and $z$ for the 2d) $=$ 11928.2346066279400 ſolid Inches; which ×d by 41.44*l.* the Value of 1 ſolid Inch of Gold, $=$ 494306*l*, 0*s*. 10*d*. 0*q*. .41471536, required. He obſerves that $45\times45\times7853981633975\times5\times\frac{1}{2}=11928.234606599512=$ Solidity of all the Globes, *otherwiſe*. Who remarks, that when the *Altitude* and *Baſe* of the Cone are equal, an infinite Number of Globes (ſo inſcribed) is *equal in Solidity to Half the whole Cone*; which is a curious Property.

This Correſpondent's Pacquet miſcarried laſt Year; who informs us that he anſwered ſeveral of the *Queſtions* and *Ænigmas*.

The Anſwers to *Wm Wimple*'s Queſtions are reſerved for next Year; ſo muſt the Account of the *Plumian Profeſſor*'s *Plunder* of the *Witchelian Calculus!* (Do Juſtice to a *Th--f.)* — The *Genealogy* of a Witch, &*c.* poſtponed.

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*To the Palladium-Author.* — Sir, By your giving the following a Place, you will oblige many of your Correſpondents, and *your humble Servant*, CRITICUS.

*Advertiſement.*—Wrighten & Redden & Trew ſpellen, & marchants akounts & Doubel entery, Likewiſe geograffy, aſtronnomy, Aſtrollogy, arethmatik, Mathemattiks, navegeſhon, The longetud, And calkeleſhon Of the moon, alſo & Moreover poetree, Heroek Lyrek Pindarrek And Doggarell, morels & Behavur, wyt & Humer, Sens & jugment, of the nuiſt faſhin, tawt heir by *rubin butchur.* *Poſtſkrap.* — Gals & bouys boorded & goot yowzitch. i Keps an evnen ſcoul fur Techen leadys the trew Us of The globs, & i calkeluts nitevetis In a *Minemum.* And i Taches lat-tin, frenſh-tin, and greke-tin, alſoe ſhorte hande in 24 howrs Eache At hom or a Brod. Inqier For the gentelmun arther at His libel-Offiz & Peepatory, on Thee hyl, *grinitch.*

## NEW ÆNIGMAS.

### I. ÆNIGMA 241, *by Mr.* Iſaac Gumley, *of* Counteſthorp, Leiceſterſhire.

COME, come, ænigmatical Bards, come away,
With an Ear of Attention regard what I ſay.
None ever like me could ſo vary their Shape,
For I'm ſometimes an Owl and at others an Ape ;
I'm a Dog, or a Cat, or a Fox, or a Hare,
A Sheep, or a Goat, or a Horſe, or a Bear ;
A Lion, a Tyger, a Bull, or a Cow,
A Coach, or a Waggon, a Harrow, or Plough ;
A Swan, or an Eagle, a Griffin, or Dragon,
A Houſe, or a Tree, or a Bell, or a Flaggon.
I'm a Ship, or a Mill, or a Crown, or a Star,
A Sun, or a Moon, or an Enſign of War ;
Nay, what is more ſtrange, I'm a King or a Queen,
Adorn'd with a Crown and majeſtical Mein.
I'm a Gen'ral of War, — yes, a gallant brave Hero,
With Features as fierce and forbidding as *Nero*.
I'm a Duke, or a Lord, or a mighty Phyſician,
A Stateſman, or Poet, or Mathematician ;
A Blackſmith, a Taylor, a Cobler, or Tinker,
A Plowman, Buffoon, or a Tunbelly Drinker ;
A Globe, or a Tun, or a Billet of Wood,
A Shoulder of Mutton, or what you think good.
But, though I'm more harmleſs by far than a Mouſe,
No Man will allow me a Place in his Houſe ;
So I'm forc'd to endure, in all Manner of Forms,
The Heat of the Sun, and more mercileſs Storms. —
But hold — for I ſee you will quickly reveal,
What here without Art I'm about to conceal.

### II. ÆNIGMA 242, *by the Rev.* T. Vaughan, A. M. Morpeth.

BROUGHT forth by Warmth, and ſometimes vital Heat,
I am launch'd forth for many a cruel Feat ;
Sometimes I'm pois'd in Air, and ſoar ſo high,
I almoſt reach the Limits of the Sky.
I'm call'd a *King*, and well deſerve that Name,
None of my Kind can equal me in Fame.
I, like the *Baſiliſk*, can cauſe Surpriſe,
And carry *Terror* in my very Eyes !
Farther to tell, I'm ſometimes mild or tame,
Do Things ſome Subjects would not do for Shame :
In Churches, Chapels, I'm ſometimes decreed
To hold the Bible whilſt the Prieſt does read.

### III. ÆNIGMA 243, *by Mr.* Thomas Sadler, *of* Whitchurch.

YE fair ones, from the Womb of Earth,
And Beaſts, and Trees, we take our Birth ;
By *Vulcan*'s Art we're form'd complete,
And often on the Ladies wait.
We traverſe all the Nation round,
In ev'ry Part we're daily found ;
Attend on ev'ry Maiden fair,
And ornamented well with Hair :
And ſometimes deck'd with Silk and Fur,
As Modes of Dreſs and Taſte occur.
Where Fops, Coquets, and *Sophy* ſtrut,
We may be found with them on Foot.

We're made to ſwallow Fleſh and Blood,
That do to us but little Good.
We trudge about through thick and thin,
And ſometimes out, and ſometimes in.
We're poſted ſometimes at a Door,
Attending Rich as well as Poor.
We wait upon Miſs *Polly Stow*,
With *Kate* and *Sue* a-milking go.
We very often make a Clatter,
And then Folks wonder what's the Matter!
And often play at Hide and Seek,
Sometimes not wanted for a Week:
With *Sophy* ſometimes walk up Stairs,
But never when ſhe goes to Pray'rs.
Yet, patiently, we Burthens bear.
We've ſaid enough — out Names declare.

### IV. ÆNIGMA 244, *by Mr.* Thomas Sadler.

THE ſwifteſt Traveller am I,
From ev'ry Quarter round I fly;
Nothing ſo ſwift but I paſs by.
In Swiftneſs next to Thought I am;
Then tell my Name, and whence I came.

### V. ÆNIGMA 245, *by* Gemini, *of* Morpeth.

LADIES, a mighty Warrior I,
You'll ſay, when you my Name deſcry;
For, frequently I do engage,
And ſometimes, too, I mount the Stage:
But then 'tis not with that *Deſign*;
For *Dogs*, I help 'em to divine.
Horſes and Birds will ſhew you Wonders!
And my Brethren teach 'em Numbers.
'Tis ſaid of-old, who does debaſe
Himſelf ſhall have a higher Place.
Before Promotion humbles me,
I'm with the *loweſt* you may ſee.
But, by a *Signal* of the Hand,
I inſtant take the ſole Command.
*Vexations* e'en the *Beſt* muſt bear;
A *Villain* does my Honours ſhare:
For ſo ſtrict Juſtice does proclaim,
That he's intitled to the ſame:
And beſt my Judges have thought fit,
That, in ſome *Caſes*, I ſubmit.
My Trial over, hapleſs Fate!
Reſigns me to my *priſtine* State.

### VI. ÆNIGMA 246, *by Mr.* Swift, *of* Stow.

THE great *Muſicians* ſtrive with me in vain,
I emulate the beſt, and tire the longeſt, Strain;
Although of *Inſtruments* I know not one,
On all I play in Concert, not alone.
*Palladium* Artiſts, known for all your Parts,
I, though untaught, can talk of all your Arts.

### VII. ÆNIGMA 248, *by Mr.* Swift.

BY me my *Kindred* are improv'd,
But are reduc'd when I'm remov'd;

*Perfection* is found in my Shape,
Which all my Kindred cannot ape.

☞ *Whoever ſends the beſt Anſwer, in Verſe, to the following Ænigma, before* Candlemas-day *next, has a Chance, by Lot, to win* 5, 4, *and* 3 Palladiums.

### PRIZE-ÆNIGMA, *by Mr.* Iſaac Gumley, *of* Counteſthorpe.

1. YE charming fair *Ladies*, to ſerve you my Trade is,
I'm always a Friend to your Sex;
If I am but preſent, the Night is quite pleaſant,
Nor Ghoſts, nor fell Demons, perplex.

2. By you I'm approv'd, nay often belov'd,
And oft to Preferment am brought;
With your Hands you embrace me, and then you place me,
Where I muſt not tell for a Groat.

3. There I, without bending, keep always deſcending,
Until I can get Nothing lower;
Then quickly I leave you, though ſeldom deceive you,
And never am ſeen any more.

4. My Body is ſlender, and frequently tender,
And ſeldom 'bove ten Inches long;
Yet when I prove bigger, of me you're more eager,
Becauſe I'm more uſeful and ſtrong.

5. I'm fair as Miſs *Faddle*, excepting my Noddle,
For that is as red as a Roſe;
From thence flows the Treaſure, that gives you ſuch Pleaſure,
And makes me be lov'd, I ſuppoſe.

6. At Night I'm moſt us'd, though ſeldom refus'd
Whenever Occaſion requires;
And, like a true Servant, in Diligence fervent,
I moſtly perform your Deſires.

7. Now, O ye fair Ladies, from what before ſaid is,
My Name you will quickly explore;
Then let it appear in *Palladium* next Year,
And I'll importune you no more.

⁂ Mr. *Iſaac Gumley*, and our other ingenious Correſpondents, are deſired to excuſe us for omitting what we have reſerved for next Year's *Palladium*; not having Room for ſeveral of their uſeful and entertaining Productions in this preſent *Palladium*; ſome of which Productions came too late for Notice, when the Copy was compiled. —— More *Ænigmas* will be printed for next Year's *Palladium*.

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## NEW QUERIES.

### I. QUERY 235, *by Mr.* R. C. *of the* Iſle of Wight.

WHERE was the *Magnus Portus* of the *Romans* in *Britain* ſituated?

### II. QUERY 236, *by Mr.* J. H—s, *of* Newport, *in the* Iſle of Wight.

A Gentleman, poſſeſſed of an Eſtate of 1000*l.* a Year, dying, left his Widow with Child, who was ſoon after married to a Gentleman of an Eſtate of 2000*l.* a Year. Two Months after which ſhe was delivered of a Boy. Whoſe Son is he? which of the two Eſtates is he apparent Heir to? whether to both, or neither?

### III. QUERY 237, *by Mr.* J. H—s, *of* Newport.

WHERE was *German Serge* firſt manufactured?

### IV. QUERY 238, *by Mr.* Iſaac Gumley, *of* Counteſthorpe.

SAGACIOUS Friends, inform me whence ariſe
Thoſe *Northern Lights* that ſtream along the Skies?

### V. QUERY 239, *by Mr.* John Harriſon, *of* Helſby, Cheſhire.

AT the dreadful Exploſion of Gunpowder at *Cheſter*, *Nov.* 5, 1772, it was *remarkable* that the *Glaſs*, in all the adjacent Windows, fell *outwards*: What Reaſon can be given for its not falling *inwards*, and for its falling *outwards* as it did?

VI. Query 240, *by Mr.* J. Stuckfield, *of* Stepney.

**WHAT** became of the Ark of the Lord, containing the two Tables of Stone, after being depoſited in *Solomon's* Temple, as mentioned in the 8th Chapter of the 1ſt Book of *Kings?* The *Jewiſh Opinion* is, that, when the Temple was deſtroyed, the Earth opened and ſwallowed it.

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## NEW REBUSES.

I. Rebus, *by Mr.* Penn, *of* Chalfont, Bucks.

TO four-fifths of a *Jade* add a *four-footed* Beaſt,
And an *Herb* you will find by *Culpepper* careſt;
An *Herb* not unknown to *Sophia* the chaſte!

II. Rebus, *by a* Northumbrian.

INVERT a Word us'd for *Immenſe*,
And then a *male Child* place behind;
A Lady's Name, of Worth and Senſe,
You'll ſee, who's fair and kind.

III. Rebus, *by Mr.* W. Hurn, *of* Watton.

THE Ladies Delight, in particular Seaſon,
Is the Place where they go for particular Reaſon.

IV. Rebus, *by the Rev.* Thomas Vaughan, A. M. *of* Morpeth.

TAKE *five Hundred*; add to it two-thirds of a Thing,
Which oftentimes keeps the *Remains* of a King;
Add to all, if you pleaſe, the beſt Part of a Swine,
And they'll ſhew you a Place that is ſplendid and fine.

V. Rebus, *by Mr.* W. Swift, *of* Stow.

A *Scripture-Meaſure* will unfold
A *Poet*'s Name, well known of-old.

VI. Rebus, *by* Triangulus.

THE Reverſe of *to looſe*, and Effect of great *Heat*,
When connected will ſhew you a fine Country-Seat,
Where the *libelling Crew* their laſt Office complete.

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## NEW PARADOXES.

I. *(Geometrical)* Paradox, *by Mr.* R. T. *in the* Iſle of Wight.

ADEPTS, reſolve me *this*, (nor think it hard;)
With five *ſquare Stones*, to pave me one *ſquare Yard*.

II. *(Geographical)* Paradox, *by Mr.* Stuckfield, *of* Stepney.

**SUPPOSE** a Ship ſails from a Port, (whoſe *Longitude* is 50° Weſt,) firſt North 150 Miles, then South 311 Miles; and finds, by Obſervation, that ſhe is 461 Miles diſtant from whence ſhe firſt failed. *Required* the Latitude of the Place ſailed from, and the Longitude and Latitude of the *Place* come to?

III. Paradox, *by Mr.* W. Jon.

WHERE muſt a *Perſon* ſtand with his *Head* and *Feet* both upward?

IV. Paradox, *by Mr.* Iſaac Gumley, *of* Counteſthorpe.

I never *come*, and yet am *here*,
Adepts, my proper Name declare.

V. Paradox, *by Miſs* Polly Stow.

I'M always *paſt*, yet ſtill to *come*,
And for *another* I make Room.

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## NEW QUESTIONS.

I. Question 499, *by Mr.* Iſaac Gumley, *of* Counteſthorpe, Leiceſterſhire.

THE *Product* of the *Sides* of a right-angled Triangle is to the *Perimeter* thereof, as 500 to 1; and the *Diameter* of the *inſcribed* Circle is to the *Baſe* as 1 to 2: *Required* the Sides and Area of the Triangle.

### II. QUESTION 500, *by Mr.* Gumley.

$$\text{GIVEN,}\left\{\begin{array}{l} x+x^2y^2=66 \\ y+y^2z^2=404 \\ z+z^2x^2=105 \end{array}\right\}\text{To find the } \textit{Values} \text{ of } x,\ y, \text{ and } z?$$

### III. QUESTION 501, *by Mr.* Gumley. *Addreſſed to Miſs* Polly Stow.

DEAR Miſs, to exerciſe your Patience,
Find what I *want* from theſe *Equations*;*
And ſince 'tis in your *Pow'r* to give,
O! why ſhould I without it live!

$$\left.\begin{array}{l} *v^2+x+y+z^2=520 \\ v^3-x-y+z^3=9332 \\ v^4+x^2+y^2+z^4=195223 \\ v^3+x+y+z^3=9443 \end{array}\right.$$

Where $v$, $x$, $y$, $z$, *denote* the reſpective *Letters* Places in the *Alphabet*, diſcovering my *Diſtreſs*.

### IV. QUESTION 502, *by Mr.* William Penn, *of* Chalfont, Bucks.

THE true *Standard-Buſhel*, when heap'd up with Coals,
Suppoſing theſe true *ſolid Inches** juſt holds,
What muſt the right Form of the *Half-Buſhel* be,
So made, that it ſhall with the *whole one* agree,
Their *Caps* in Proportion as *One* is to *Three*?

*2979.2349125

### V. QUESTION 503, *by Mr.* Penn.

A Purchaſer bought 2500 Acres of Land, and gave 8*l.* for every Chain in *Breadth*, and 5*l.* for every Chain in *Length*; and gave the *leaſt Money* poſſible for his Bargain: What were the *Dimenſions* of the Land he purchaſed? and *how much Money* did the Purchaſe coſt?

### VI. QUESTION 504, *by Mr.* John Shadgett, *of* Roſs, Herefordſhire.

A Country Gentleman intends to erect a *Malt-Ciſtern*, whoſe Content ſhall be 250 *cubic* Feet; but, from the Situation of the Place, he is under a *Neceſſity* of having the *Depth* equal to Half the *Length*, and the *Breadth* a *geometrical Mean* between them both. *Required* the *Dimenſions* of the *Ciſtern.*

### VII. QUESTION 505, *by Mr.* Alexander Rowe, *of* Reginnis, Cornwall.

A Miſer, by griping, in Riches abounds,
Who, in *forty-five* Years, has heap'd *ten-thouſand* Pounds;
Suppoſe his Coin *equal* — Half Silver, Half Gold,
What *Proportion* the *Bags** that can each of it hold?
And, Adepts, attend — I have two *Queries* more;
What's the *Weight* and the *Bulk* of each ſeparate Store?
And, when *melted together*, the *Cone*'s *Surface* ſhew,
Whoſe *Height* to its *Baſe*† is as *Five* is to *Two.*‡

† *Diameter.* ‡ *Inches.*

**Each Bag twice as long as broad; as the Superficies of each Coin, ſeparately melted, is in the Form of a Cylinder, whoſe Lengths to their Diameters are as 2 to 1.*

### VIII. QUESTION 506, *by Mr.* Rowe.

FOR Trial or Experiment,
*Theſe** to Miſs *Stow* I now have ſent;
And *Rowe* to *Stow* I would cement.

$$\left.\begin{array}{l} *x+y-z=20 \\ x^3+y^3+z^3=54720 \\ xy+xz-yz=449 \end{array}\right\}\left\{\begin{array}{l} x=? \\ y=? \\ z=? \end{array}\right.$$

### IX. QUESTION 507, *by Mr.* Rowe.

*INVENIRE Aream recti-angulati Trianguli, quod eſt Hypothenuſa* $= x^{5x}$, *Baſis* $= x^{3x}$, *et Cathetus* $= x^{x}$?

### X. QUESTION 508, *by Mr.* George Hicks, *of* Reedneſs.

A Tradeſman bought a Piece of Cloth for 25*l.* and, by ſelling it again, he found that he *loſt* 20 *per Ct.* whereas he expected to have gained as much *per Ct.* as the Cloth coſt him. What did the Cloth coſt him, and how much was it ſold for?

### XI. QUESTION 509, *by Mr.* Ward, *Collector*, *at* Holdbreach-Bar.

AN Officer, in his Ride, a *Ciſtern* found,
Whoſe Top triangular was, the Bottom round;
To find its *true Content** he does deſpair,
And begs ſome Adept's Skill to make it clear.

**Each triangular Side at the* Top = 100 *Inches*; *Diameter at the* Bottom, 65; *the longeſt Line within the* Ciſtern, 99 *Inches*; *required the* Content *thereof in Gallons.*

### XII. QUESTION 510, *by Mr.* Thomas Robinſon, *of* Biddick.

A Cone is cut parallel to its ſlant Side, whoſe *Section* being a *Parabola*, the *Abſciſſa* thereof 37.5 Inches, and the *Semi-ordinate* 25.9807, required the Cone's *Dimenſions*, when the *convex* Surface is the *leaſt poſſible*.

### XIII. QUESTION 511, *by Mr.* Edward Johnſon, *of* Hull.

REQUIRED the *Dimenſions* of the leaſt parabolic Conoid, whoſe Equation is $px = y^3$, that will circumſcribe a *Sphere*, whoſe Diameter is 50 Inches.

### XIV. QUESTION 512, *by Mr.* Johnſon.

IF a Piece of dry Oak, in the Form of the *Fruſtum* of a *ſquare Pyramid*, (whoſe Length is 25 Feet, and the Sides of the oblong Ends 18 and 8 Inches, *reſpectively*,) be ſupported in a horizontal Poſition by a *Prop* at each End; it is *required* to find the *Weight* ſuſtained by each *Prop*; and alſo how much the *Prop*, at the ſmall End, muſt be ſhortened, ſo that each *Prop* may ſuſtain an equal Weight.

### XV. QUESTION 513, *by Mr.* Johnſon.

GIVEN the *vertical* Angle of a *plain* Triangle = 70°, the *Sum* of their Sides = 176, and their continual *Product* = 142000; to find the *Sides* ſeparately.

### XVI. QUESTION 514, *by Mr.* Michael Taylor, *of* Marley-hill.

IN *North* Latitude, in a certain Day of the Year, 1773, the *Shadow* of my Walking-Stick, 5½ Feet long, ſtanding perpendicular to the Horizon, at 7 in the Morning, was 8¼ Feet; and, 4 Hours after, its Shadow in the ſame Place was but 6⅓ Feet: *Required* the Latitude where, and Day of the Year when, this happened, by a *quadratic* Equation.

### XVII. QUESTION 515, *by Miſs* Polly Stow.

REQUIRED the unequal Diameters of a Caſk at both Ends differing by 6 Inches, to be made ſo, that the Bung Diameter, and alſo the Length, ſhall be 40 Inches each, to hold the moſt *Champaign poſſible*; and what will its Content be in Gallons? and what the *Form* of the Caſk?

### XVIII. QUESTION 516, *by Mr.* Alexander Rowe.

*QUÆ eſt Area Curvæ, cujus Equatio eſt* $\frac{x^{12}}{\overline{3a-2x}|^{8}} = y^4$?

### XIX. QUESTION 517, *by Mr.* Wm Hayes, *of* Frodſham, Cheſhire.

GIVEN the Perpendicular of a *plain* Triangle, 19, the *Ratio* of the Segments of the Baſe as 1 to 3, and the Ratio of the Sides as 3 to 5, to conſtruct this Triangle and give its Dimenſions.

### XX. QUESTION 518, *by Mr.* Hayes.

A *Point* in a right-angled Triangle is diſtant from the 3 *angular* Points, 20, 40, and 50; required the Sides of that Triangle.

### XXI. QUESTION 519, *by Mr.* Michael Taylor, *of* Marley-hill, *near* Newcaſtle.

GIVEN the Sum of the *Axes* of a *Spheroid* equal 100, and the *Solidity* of the *greateſt* inſcribed *Cone* to the *Solidity* of the greateſt inſcribed *Cylinder* as 2 to 3: Required the *Dimenſions* of the Spheroid, with the *Inveſtigation*.

### XXII. QUESTION 520, *by* Gemini, *of* Morpeth.

THE *Difference* between the *Area* of a right-angled Triangle, and its *circumſcribing* and *inſcribed* Circles = 218.6 and 45.7344 reſpectively. *Required* the Triangle.

### XXIII. QUESTION 521, *by Mr.* John Harriſon, *of* Helſby, Cheſhire.

I bought a Cheeſe of *Margery Scot*,
(To tell the Truth, I paid her not,)
And we have both the *Weight* forgot:
A *Segment* of it does remain,
The *Girth* did thrice the Arch contain;
*Twelve Pounds* this Segment weighs alſo;
The Weight o'th *Whole* I fain would know.

### XXIV. Question 522, *by Mr.* Thomas Sadler, *of* Whitchurch, Shropſhire.

INGENIOUS Artiſts, whoſe induſtrious Skill
Is ſure to find, ſeek after what you will;
Name me the *Prize** that Wiſdom's Favourite gains,
When crown'd with Laurels on *Britannia*'s Plains!

**The Word, denoting this* Requiſition, *is compoſed of* 4 *Letters; the Sum of their* 4 *Places in the Alphabet is equal to* 24; *the Product of their* 4 *Places is equal to* 360; *the Product of the* 3 *laſt Letters Places is equal to* 60; *and the Product of the* 1*ſt*, 2*d*, *and* 4*th*, *Letters Places is equal to* 30: Required *the* Word, *denoting this* Requiſition, *by a* quadratic *Equation.*

### XXV. Question 523, *by Mr.* William Pen, *of* Chalfont.

A Cone is 32 Feet long, and its Circumference at the Baſe 16 Feet; to find the Content thereof in *Feet*, by an infinite Number of *Girths* taken in each Middle Part meaſured; according to the common Method of meaſuring Solids, by $\frac{1}{4}$ of the Girth ſquared and multiplied into the Length.

### XXVI. Question 524, *by Mr.* W. Wilſon, *of* Norwich.

IF the Diameter of a cylindrical Veſſel be 20 Inches, *required* its *Depth*, that, when filled with Water, or any Fluid, the Preſſure on the Bottom and Sides ſhall be *equal* to each other.

*** *Whoever ſends the beſt Anſwer to the following Queſtion, before the Beginning of* April, *has a Chance, by Lot, to win* 12 Palladiums. *Dentur Digniſſimo.*

### Prize-Question, *by the* Palladium-Author, *junior.*

TO determine the *greateſt* Number of Acres of Land that can be incloſed by 5 given ſtrait Fences, of 1000, 2000, 3000, 4000, and 5000, Yards in Length, reſpectively, with a 6th ſtrait Fence, *required.* And alſo to give a *general* and *practical* RULE for incloſing the *greateſt Areas* by any Number of ſtrait Sides given, with, and without, another Side *required.*

---

### *To the* PALLADIUM-AUTHOR.

WITH Joy, O my Friend, I behold, ev'ry Year.
Your Book with additional Graces appear;
Unlike the weak flimſy Productions o'th' Age,
Inſtruction and Pleaſure adorn ev'ry Page.
Still, ſtill, may it flouriſh, ſtill ſhine in our Schools,
And by all be admir'd except Madmen and Fools.   ISAAC GUMLEY.

---

*Prizes won.* — *Practical Navigator* 12 *Prize Queſt. Palladiums*; Mr. *Iſaac Gumley*, of *Counteſthorpe*, 5 *Prize Ænig.* Ditto; Miſs *Polly Stow* 4; Mr. *Penn*, of *Chalfont*, 3. *Inveſtigator*, 4 *Prize Quere* Ditto; *Criticus*, 3; *Polydore*, 2. Who are ſeverally deſired to ſend to Mr. *Cole*'s, in *Fleet-ſtreet*, in their own Hand-Writing, for the ſame. Mr. *Alex. Rowe*'s *Palladiums*, for 1773, are ſtill there unſent for. — More of the *Palladium-Society* in our next.

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